



Northwest Fire District
Community Risk Assessment
Standards of Cover
October 2016





Commission on
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CRA-SOC Update Log

Description	CRA-SOC Team Facilitator	Signature	Fire Chief	Signature	Date
2016 CRA-SOC	Gary West		Michael Brandt		
2017 update					
2018 update					
2019 update					
2020 update					

The CRA-SOC is designed to be a dynamic document
and shall be updated on an annual basis.

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*Special thanks to Pima Association of Governments
for their assistance in providing demographic data*

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Executive Summary

Fire Chief Michael J. Brandt

The development of the third edition of the Community Risk Assessment-Standards of Cover (CRA-SOC) document represents the District's comprehensive effort to identify and categorize risk in our community and develop performance objectives along with effective response models for fire, EMS, hazmat, technical rescue, and wildland emergencies. The CRA-SOC allows District residents, employees, and those who collaborate with us to better understand the capabilities, risk, and service levels that NWFD provides. Since the development of the first edition in 2006, the CRA-SOC has provided a clear plan to help us accomplish our mission to "Save lives, protect property and care for our community." The CRA-SOC is not intended to be a stand-alone document, but to be integrated with our Strategic Plan's goals and objectives. It is designed to be a living, dynamic document that will be updated and adopted on an annual basis.

Based on work completed in Section 1 - Area Characteristics, we learned that NWFD has grown in population by six percent in five years and our urban density areas have increased significantly. Our area economics continue to improve, demonstrating strong growth in the North Battalion, and are expected to continue this trend in the near future. Countering our growth, however, are on-going annexation efforts by the City of Tucson into areas of the Northwest Fire District, a significant threat to the sustainability of current service levels to our community.

The risk assessment identified nine key large-scale risks, some of which require the development of more detailed response plans. The fire risk assessment clearly identified that single family residences represent the vast majority of our working fire call volume. The fire risk assessment also highlighted the associated increased risk to the public and our firefighters due to modern construction techniques, associated hydrocarbon and synthetic based fire loads, as well as other factors.

The risk assessment process helped us concentrate on the service delivery effects of the new Interstate 10/Ina Road construction project now in its first phase. We will utilize the methodology used in the development of this CRA-SOC document to assess the construction project's effect on our operations and take measures to ensure we minimize its impact on emergency service delivery. While the construction presents service delivery challenges for the next two years, the ultimate result of the project's completion will be improved response times for emergencies in the area.

Analysis of our call type and volume for the CRA-SOC demonstrated the continued increase in service demand for emergency medical services. NWFD, in recent years, has responded to this demand growth in various ways that range from implementing new EMS dispatch protocols to initiating ALS transport services in 2015. The challenge moving forward will be to continue to



improve EMS response services while, at the same time, maintaining current fire and other response capabilities.

Our evaluation of current deployment and performance verified the need to relocate Station 37 and construct a new station near Twin Peaks and Interstate 10. These projects will be funded by the passage of the November 2016 bond election. The evaluation process also identified areas with excessive travel times where we will initiate more prevention efforts.

The CRA-SOC identifies that, overall, NWFD is currently meeting its baseline deployment and response time standards. That said, opportunities have been identified for response time improvement and are discussed in Section 5, Evaluation of Current Deployment and Performance and Section 6, Plan for Improving and Maintaining Response Capabilities. New response time benchmarks (goals) have been developed that NWFD will strive to reach in the coming years as we continue to identify methods for improvement through staffing efficiencies, and, when applicable, proven technological advances.

There is still much work to be done as a result of this document. Key to the on-going success of this CRA-SOC will be adhering to the plan for maintaining and improving response capabilities outlined in Section 6 and acting on the key issues and recommendations in Section 7. Current deployment and performance will continue to be analyzed on a regular, formalized basis to ensure we are delivering emergency services in the most effective and fiscally responsible manner possible.

Prevention and Safety Services will have a significant role as we continue to maximize risk reduction for the public and our members. The risk assessment process revealed that many of our occupancies have relatively low-risk categories only because of effective plan review and inspection practices regarding fire suppression systems. The development of targeted prevention programs in areas with extended response times and maximum fire risk occupancies are two examples of the key role Prevention and Safety Services will have as part of institutionalizing the CRA-SOC.

NWFD will continue to learn from the CRA-SOC process to adapt and respond to changing community needs and service demands as part of our commitment to the primary goal of the accreditation process, *continuous improvement*. All inputs have yielded enormous value, yet, the single most vital resource in the development of our CRA-SOC was the countless hours expended by many members of the organization – each bringing their expertise and experience forward for the benefit of our organization and community. I would like to sincerely thank all the CRA-SOC contributing members for their dedication to this effort.

Introduction

This report serves as the Community Risk Assessment and Standard of Cover (CRA-SOC) - 3rd edition for Northwest Fire District (NWFD). The main purpose of this report is to 1) identify and assess risks specific to the citizens, visitors, and businesses of the Northwest Fire District and 2), to allocate an effective and efficient distribution and concentration of resources to appropriately respond to and mitigate the identified risks.

It is the intent of this document to meet the requirements of the 6th edition of the Commission on Fire Accreditation International (CFAI) Standards of Cover guidelines. CFAI defines the two core elements of this document in the following way:

- **Community Risk Assessment** is the evaluation of fire and non-fire hazards and risk, taking in to account all pertinent facts that increase or decrease risk in order to define standards of cover.
- **Standards of Cover** are those written policies and procedures that establish the distribution and concentration of fixed and mobile resources of an organization.

The CRA-SOC is one of three documents required to maintain the District's accreditation status. The two other documents required as a part of this process include the District's Strategic Plan and a Self-Assessment Manual that includes 252 performance indicators covering ten categories. Creating this document required a detailed analysis of many aspects of our community and the manner that NWFD provides service to it. The CRA-SOC was created primarily utilizing in-district resources: District databases including various record management systems, computer aided dispatch (CAD), and geographic information services (GIS) resources. In addition, local and federal databases were consulted for demographic and other relevant data.

Section 1 provides an overview of how NWFD is managed and funded as well as community characteristics such as population density and geographical features. Section 2 lists a brief discussion of the different services currently delivered. Section 3 represents the community risk assessment portion of the document and includes assessment of large scale risks such a major hazmat event followed by risk assessments the different classes of risk that NWFD is responsible for managing including fire, EMS, hazmat, and technical rescue. Resulting from the risk assessment is the development of critical tasks and the associated effective response forces designed to mitigate the identified risks.

Section 4 describes the current deployment of fixed and mobile resources and performance of emergency services provided with an emphasis on response time elements. Based on community expectations and NWFD standards, Section 5 provides an evaluation of the current deployment and performance. Section 6 presents the District's six step plan for improving and maintaining response capabilities. The last section, Section 7 lists key findings resulting from the development of the CRA-SOC and lists associated recommendations.



Section 1

Documentation of Area Characteristics

Legal Basis for Existence and Description of the Governance Model

The Northwest Fire District (NWFD) was established in 1983 by a group of residents in the unincorporated area of northwest Tucson who were dissatisfied with fire and rescue services that were provided at that time, by a private entity on a subscription basis. On August 23, 1983, an election pursuant to Arizona Revised Statute §48-261 was held for the purpose of creating the Northwest Fire District. On October 18, 1983, the Pima County Board of Supervisors passed Resolution No. 1983-241, which stated that a majority of the votes cast in the election were in favor of forming the Northwest Fire District; and that the Northwest Fire District was duly organized and established; and furthermore, recognizing the boundary as described in the resolution.

Arizona Revised Statute §48-804 requires the Governing Board to meet monthly and as part of its duties to prepare an annual budget. The Governing Board, through resolution or via the budget process, reviews and approves policies or services provided by the District. NWFD is operated under the same title, Chapter 5, Article 1. In accordance with this statute, NWFD is administrated and directed by five elected board members who serve staggered four year terms.

Northwest Fire District operates under mission, vision, and values statements (Appendix 1.A). These provide the foundation for the strategic plan and the annual strategic plan update. The strategic plan is intended to be a guiding document for the budget development process. An annual budget process is completed by the Budget Committee and adopted by the Fire Board.

Within its legal boundaries, NWFD provides prevention, fire, emergency medical services (EMS) and special operations response services to an area of approximately 144 square miles with a population of 116,788. A single large industrial plant is served on a contractual basis. NWFD protects property within its boundaries assessed at a total of approximately \$1.036 billion.

Organizational Overview

Northwest Fire District has a chief administrative officer (Fire Chief) that serves on a contractual basis to the Fire Board. The Fire Chief is supported by two assistant chiefs, fire marshal, chief finance director, community affairs manager, and administrative services director. These positions are supported by additional staff as illustrated in the organizational chart in Appendix 1.B.



Major Milestones

Major milestones in the past ten years are illustrated in the following time line:

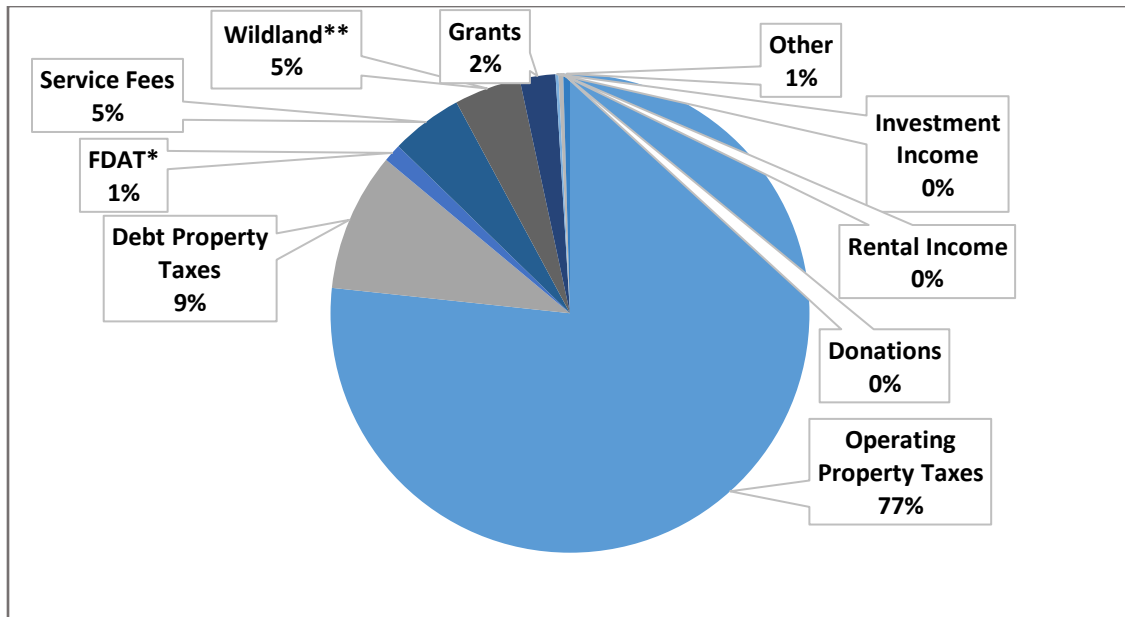
Major Milestones



Funding Sources

Slightly over three-quarters of funding comes from property tax. There are several other sources of funding, as illustrated in Figure 1.1. Expenditures by function are illustrated in Figure 1.2.

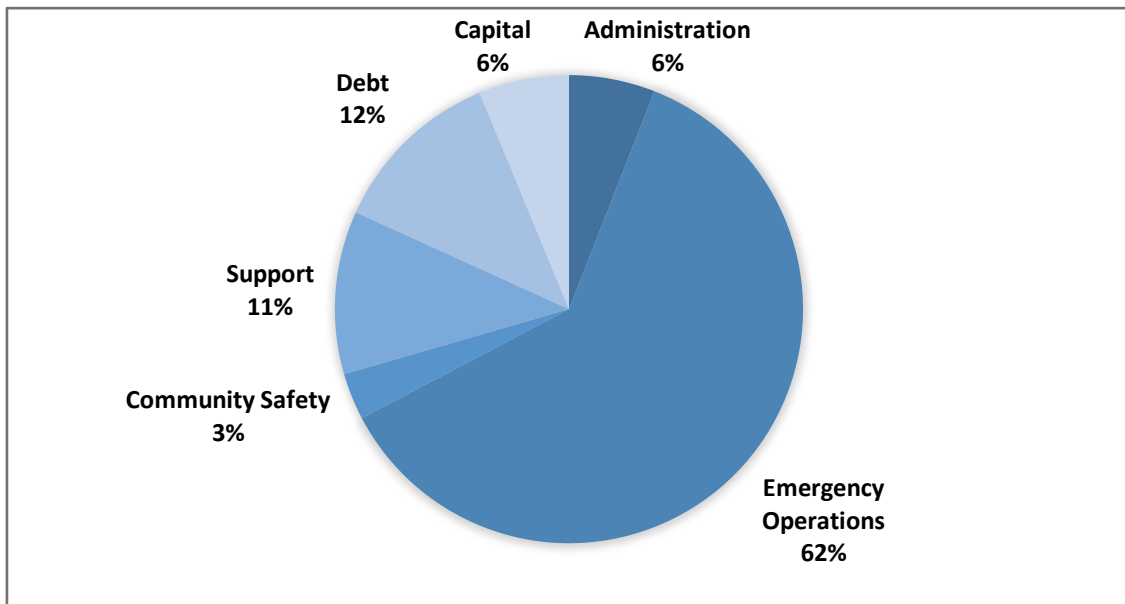
Figure 1.1



* FDAT is Fire District Assistance Tax in accordance with Arizona Revised Statute §48-807.

**Wildland funding source is through vehicle and personnel for out of District assignments in accordance with contract agreement with the Arizona Department of Forestry and Fire Management.

Figure 1.2
Expenditures by Function

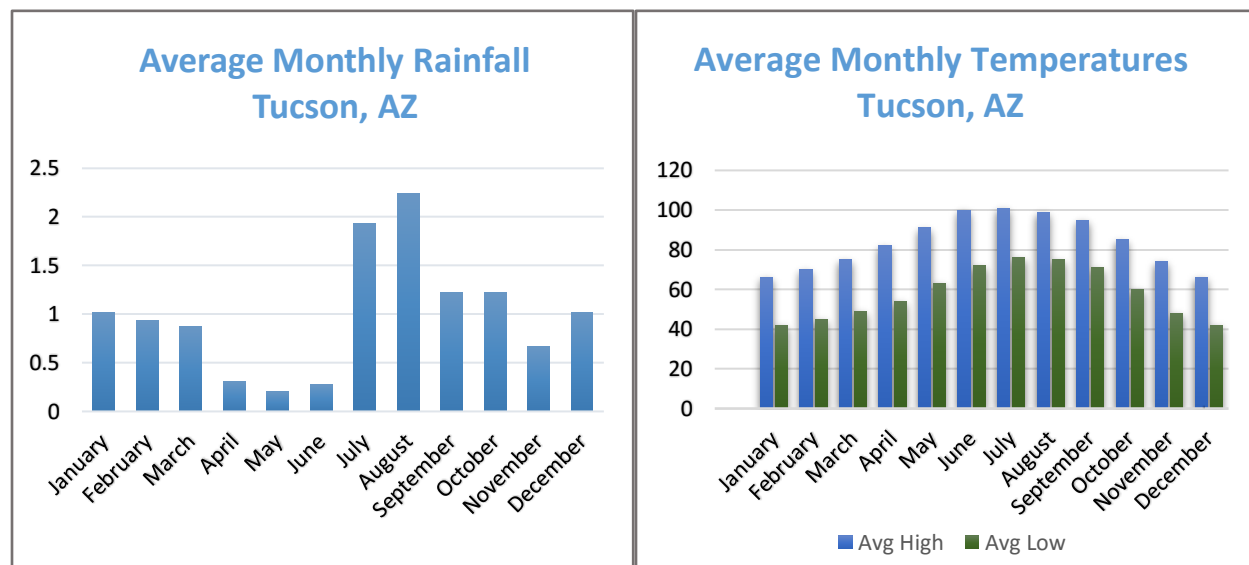


Climate

According to the Köppen climate classification system, the Tucson area is classified as semi-arid¹. Average annual rainfall is slightly less than 12 inches, the vast majority of which falls during the summer “monsoon” season and the winter months. The typical relative humidity is low compared to many other areas of the country, with humidity readings in the single digits not uncommon in late spring and early summer months.

The major weather events in the District usually consists of severe thunderstorms that are triggered by a monsoonal moisture pattern from the Gulf of Mexico, generally occurring in late June, July, August, and early September. These storms often produce heavy lighting and wind. As a result, they can trigger flash flooding and strong microburst winds, which can approach upwards of 70 mph.

Winters are generally mild, with the number of nights dropping below freezing rarely exceeding ten. Snowfall is also rare, occurring on average every few years and generally light in accumulation. Daytime highs during winter months are generally 60-75 degrees, and daytime highs during the summer months’ range from 95-115 degrees. The area is susceptible to prolonged drought periods; Arizona is in the 21st year of a prolonged drought. The Tucson area has received less than 80% of its normal rainfall since the 1990’s. Many research studies suggest that this trend will continue for an extended time.



Geographical/Topographical Description and Features

The Northwest Fire District is located within the Sonoran Desert in Southeastern Arizona. Elevations within the District range from approximately 2200 feet along the Santa Cruz River floodplain, to approximately 4100 feet above sea level in the Tortolita Mountains, along the northern edge of the District. The topography within NWFD varies from flat, potentially flood-

¹ These climates are characterized by where precipitation is less than potential evapotranspiration.



prone land near the Santa Cruz and Rillito Rivers, to steep and rocky terrain in the Tucson and Tortolita Mountains. Much of the developed area of the District lies on gentle to moderate sloping foothills with typical Sonoran Desert vegetation that is light to moderate in density.

The Santa Cruz River runs generally from south to north through the western section of the District and is the major drainage/water feature in NWFD. There is a substantial amount of commercial and residential development along the Santa Cruz River, nearly all of which is protected by soil cement bank protection along the river channel. All the rivers and washes in NWFD are seasonal, with the exception of several miles of the Santa Cruz River which has a perennial low volume flow of treated effluent from a large wastewater reclamation facility that serves much of the Tucson metropolitan area. The transition areas between the mountains and floodplains are primarily alluvial fan² deposits, areas that can be susceptible to localized flooding during periods of heavy rain that can fill and overflow normally dry washes.

Geology

There are two prominent geologic features in NWFD, the Tucson Mountains, generally running along the western boundary of the District, and the Tortolita Mountains at the far northern edge of the District. Neither mountain range is volcanically active. The Tucson Mountains primarily consist of igneous rock, including basalt and tuff. The Tortolita Mountains are primarily metamorphic, with granite and schist making up the dominant rock types with some old flows of volcanic basalt also present. As distance increases from these mountain ranges, rock formations give way to transitions of alluvium material and eventually axial stream deposits. These stream deposits along the major drainage features result in very granular, sandy type soils to relatively heavy, expansive clays. There are no known active major faults in either of the two mountain ranges.



Part of the Tortolita Mountains in Station 39's first-due area.

² Alluvial fans are fan-shaped deposits of water-transported material (alluvium). They typically form at the base of topographic features where there is a marked break in slope. Consequently, alluvial fans tend to be coarse-grained soils, especially at their bases. At their edges, however, they can be relatively fine-grained.

Water Resources

As in any desert community, water is a critical resource for the Tucson regional area. There are two basic sources of water in the District. Groundwater from beneath the Tucson Basin is a significant source of water. In addition, the Central Arizona Project Canal that delivers Colorado River water passes through the west side of the District and provides an additional shared source of water. This imported water is blended with native groundwater at a facility west of the District prior to service delivery, in the future this source will likely account for more of the water usage in the District. It is recognized, however, that at some point in the future the area's allocation of water from the Colorado River via the Central Arizona Project may decrease as other municipalities in Arizona, Nevada and California begin using their Colorado River water allocation at a higher volume.

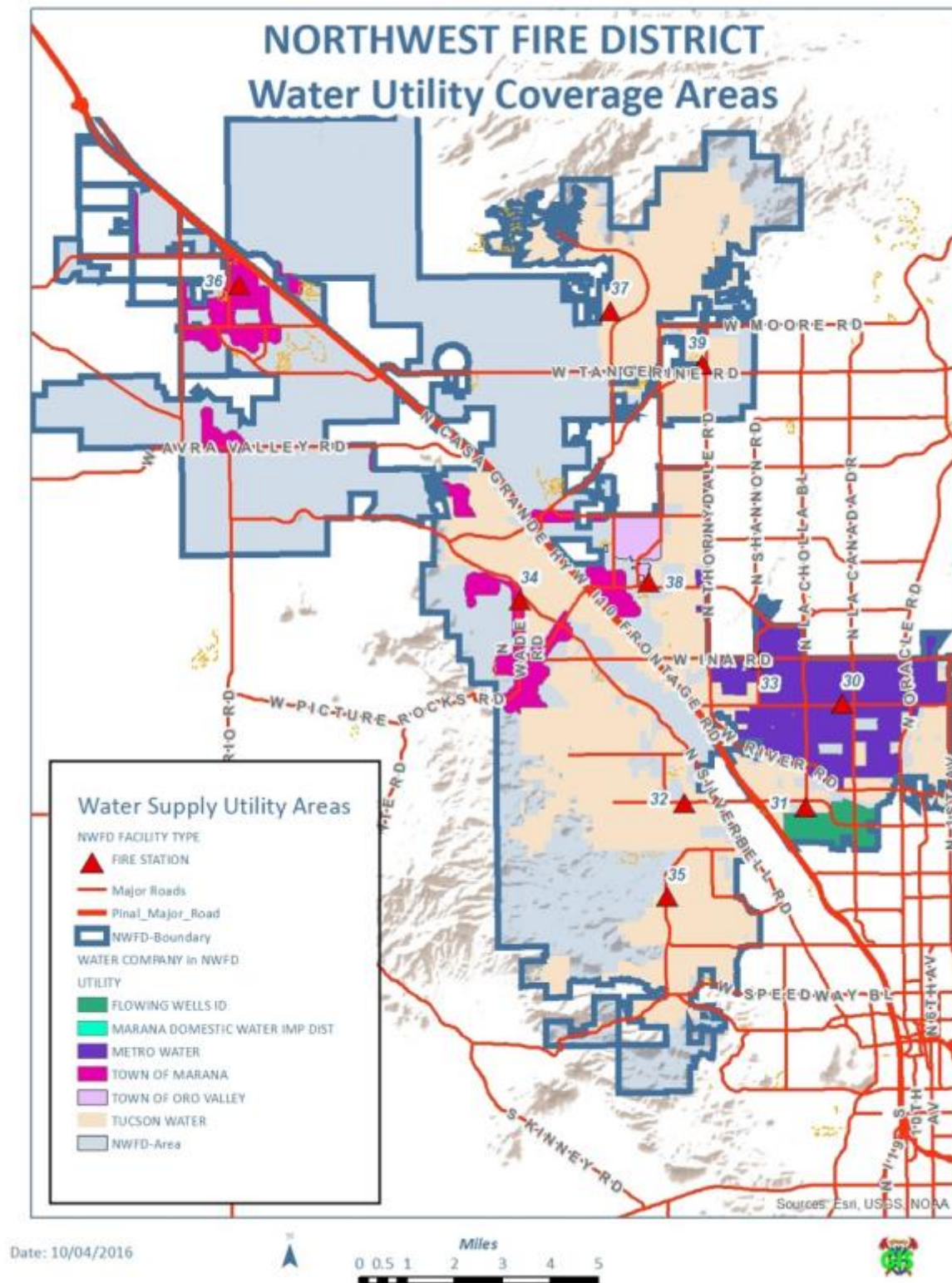
Reclaimed water continues to be a growing resource; this resource is currently limited to irrigation of golf courses, parks, and other recreation areas in the District. With the continued development of the use of Central Arizona Project water and reclaimed water, along with aggressive conservation programs, it is projected the area will have sufficient water supply to keep pace with the projected growth for the near future. In the long term (20-50 years), there are many questions remaining regarding the adequacy of the area's water supply.

Five different water entities serve the District population. The boundary areas of these entities are illustrated in Figure 1.3. There are some individual residential occupancies on larger lots that are served by privately owned wells, but these are relatively rare. The vast majority of the District's developed areas are provided with adequate hydrant networks; development areas without hydrants are further discussed and illustrated in Section 3.



The Central Arizona Project Canal and associated pumping station in NWFD.

Figure 1.3



Population and Demographics

Based on data provided by the Town of Marana and Pima Association of Governments³, the total population of Northwest Fire District in 2016 is approximately 116,788. Of the total population served, 35% reside in the Town of Marana with the balance (65%) residing in the unincorporated county area of NWFD. Figure 1.4 shows the Town of Marana and unincorporated area of Pima County NWFD serves.

To maintain consistency with the two previous editions of the Standards of Cover, NWFD has chosen to use the four population density classifications as defined in the previous Commission on Fire Accreditation International – Fire & Emergency Service Assessment Manual (eighth edition), with one change. The Urban classification has been changed to >2500 people per square mile from >2000 people per square mile to align with the definition in the new Standards of Cover, sixth edition. The four population classifications are defined as:

- Urban: Population density over 2,500 people per square mile.
- Suburban: Population density of 1,000-2,499 people per square mile.
- Rural: Population density of less than 1,000 people per square mile.
- Wilderness/Undeveloped: Any rural area not readily accessible by public or private maintained road. Generally, has very little if any permanent population.

Using a per-square mile as the minimum size sample, Figure 1.5 illustrates the range of these population classifications in NWFD. Ethnic make-up for areas served by NWFD are illustrated in Figure 1.6 and Figure 1.7.



Example of rural population classification in Station 35's first-due area.

³ Marana population statistics from Town of Marana website, <http://www.maranaaz.gov/live-work-play>. Unincorporated area statistics from the Pima Association of Governments (PAG). PAG is the region's federally designated metropolitan planning organization and consists of all major local government and tribal entities in the Tucson metropolitan area.

Figure 1.4

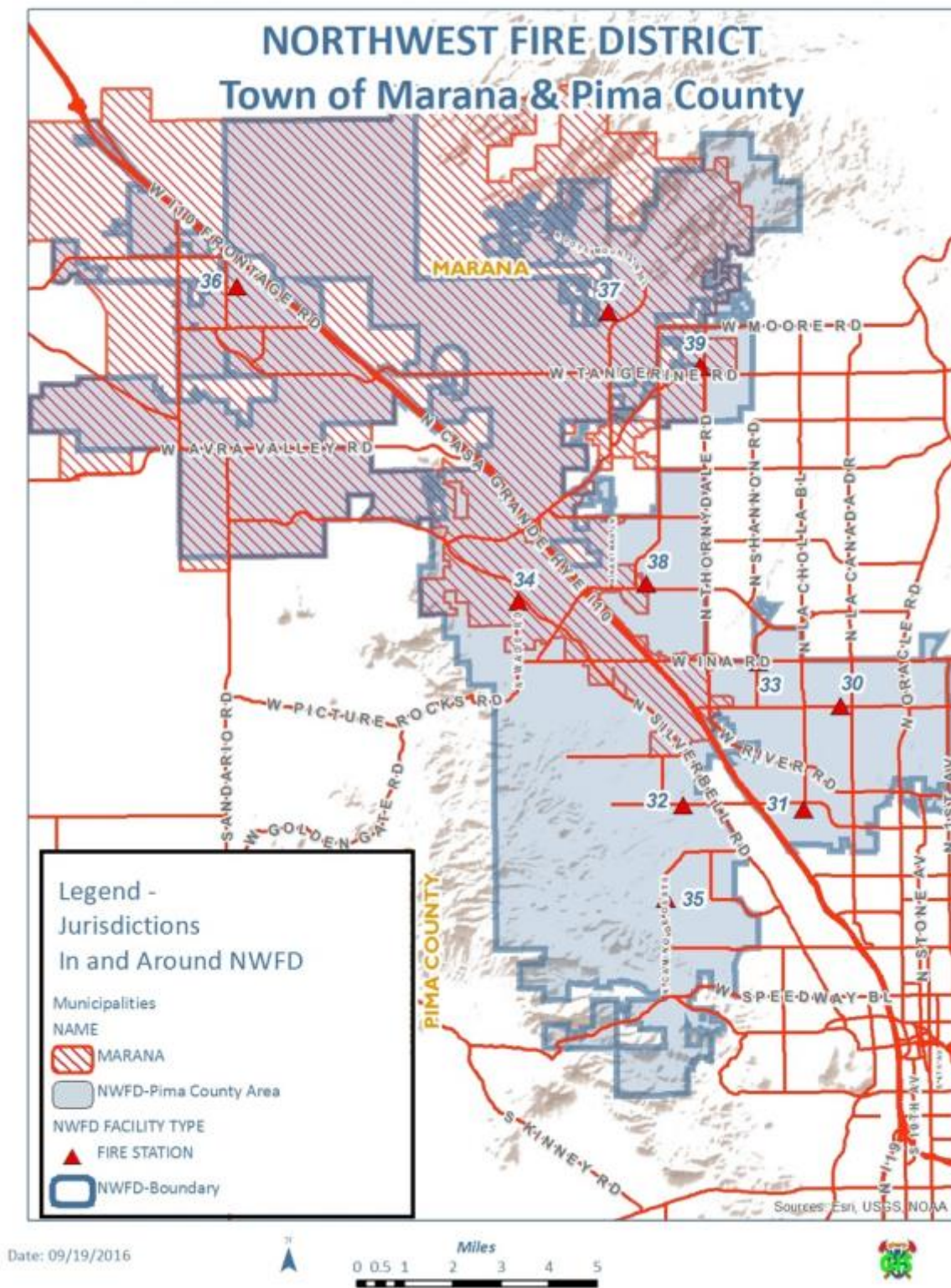


Figure 1.5

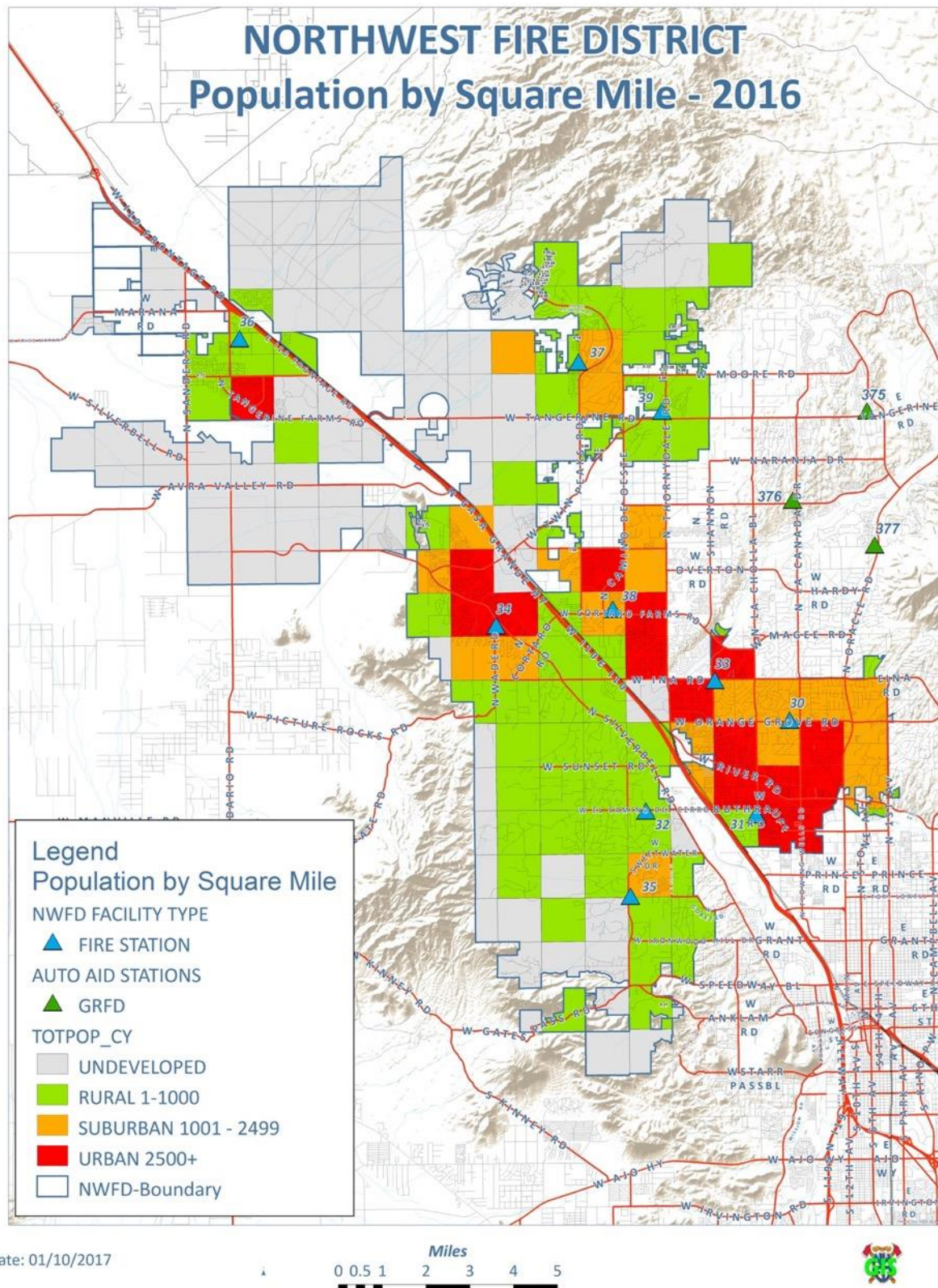


Figure 1.6
Unincorporated Pima County Service Area Ethnicity

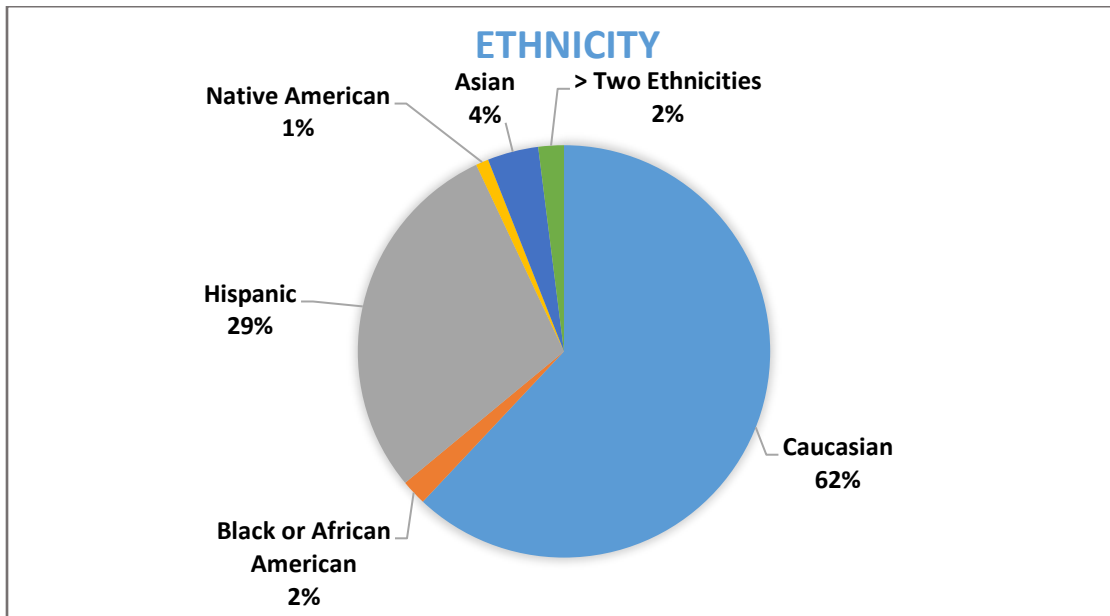
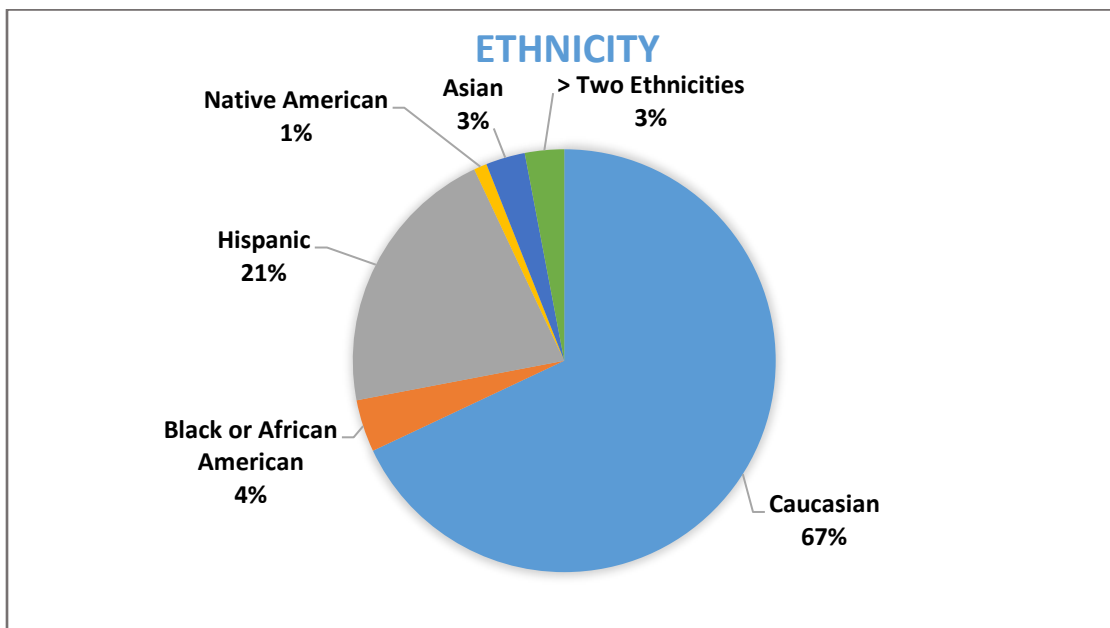


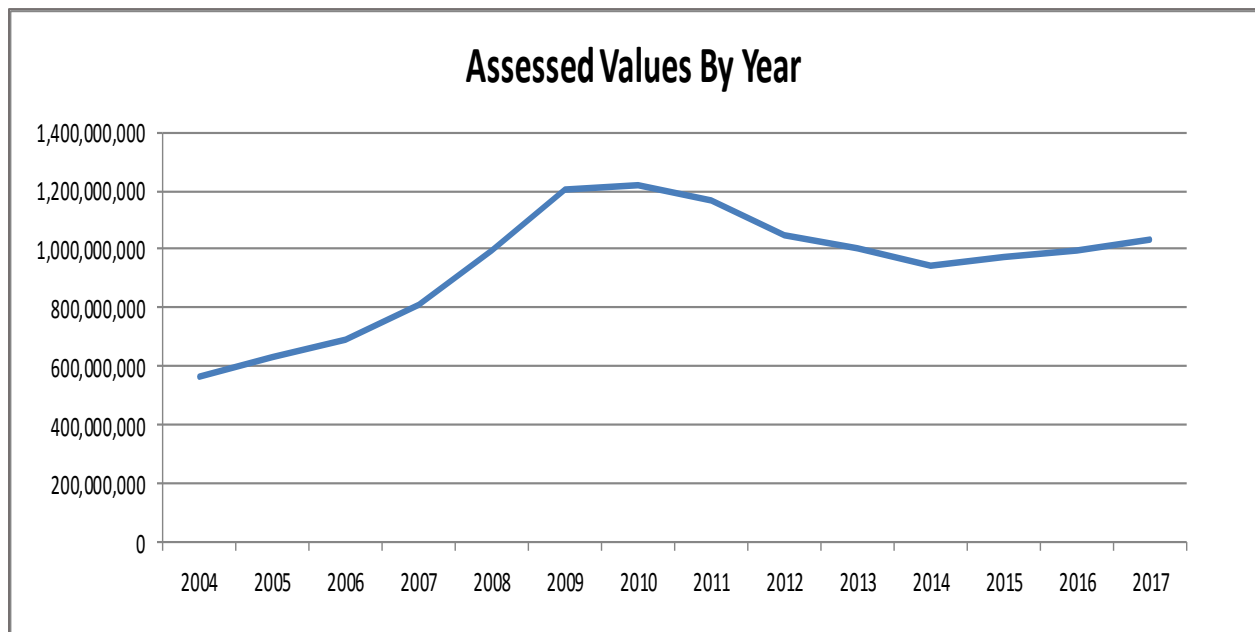
Figure 1.7
Town of Marana Ethnicity



Area Economics

The economic base in NWFD is relatively diverse, but is primarily supported by many large and small retail businesses, light industry, and the health service industry. Tourism also significantly influences the economy within NWFD, contributing to a sizeable number of hotels and restaurants in the District. There are also a moderate number of local, county, state and federal government facilities and offices that contribute to the area economy.

The area economics have been steadily improving over the past five years, albeit at a relatively slow rate. The NWFD assessed value chart below is indicative of this trend.



Statistics developed by the University of Arizona Eller College of Management also reflect this ongoing trend, with a net gain of nearly 1% employment growth in 2015 in the Tucson area⁴. This trend is expected to increase slightly over the next several years, along with an anticipated continued slow rate of increase for assessed values.

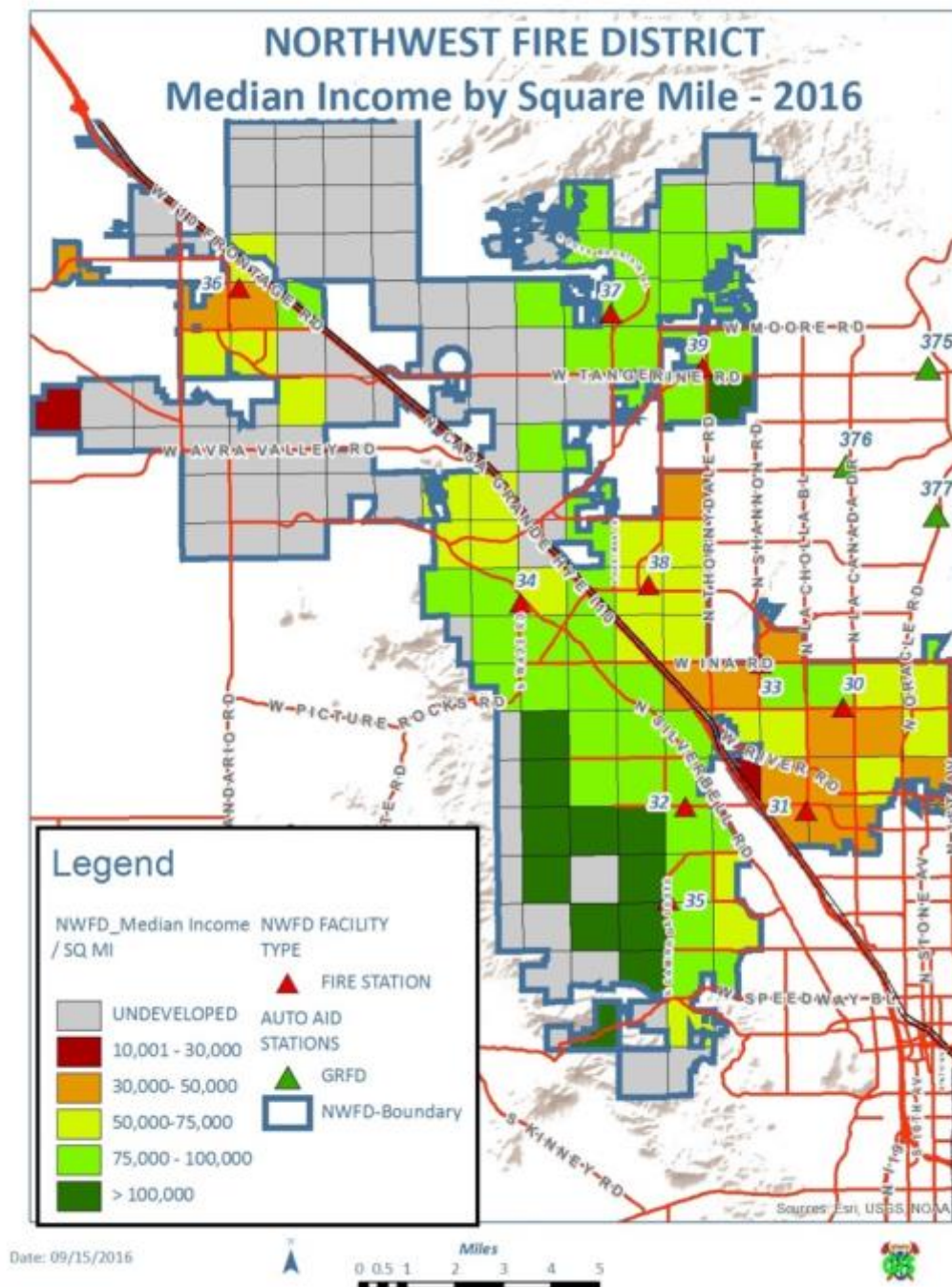
Annexations of property into NWFD for the years 2012-2015 have resulted in an increase of \$509,900 in tax revenue. Conversely, the District has seen a decrease in tax revenue as the result of successful annexation efforts in 2016 by the City of Tucson previously within the Northwest Fire District that as a result has offset some of this increase. The result of this annexation activity has resulted in a decrease of \$188,000 in annual tax revenue. It is expected that the City of Tucson will continue to seek out annexation opportunities within the District's boundaries in the coming years.

⁴ University of Arizona Eller College of Management, Economic and Business Research Center, <http://ebr.eller.arizona.edu>

Socio-Economics

Northwest Fire District serves a diverse socio-economic community from very low income/assessed value areas to affluent foothills areas with high net incomes and assessed values. Figure 1.8 that illustrates the median income within the District is evident of the diverse socio-economic community NWFD serves.

Figure 1.8





Current and Future Development

New construction plan reviews by the Prevention & Safety Division have shown an increase in the past four years as the area economy continues to recover. The number of completed plan reviews in the past six years are included in Figure 1.9. Major projects expected to impact service delivery are listed in Figure 1.10.

Figure 1.9



*Unusually high number of plan reviews due to new Tucson Premium Outlets Project.

Figure 1.10

Current and Future Major Developments by Station First-Due Area

Station First-due Area	Description	Estimated Build-Out Time
30	Sage Desert Assisted Care, 104,000 sq. ft. facility	2017-2018
30	Large garden style apt complex, 600 W. Orange Grove Rd	2017
34	Saguaro Bloom Master Plan community, 1,900 residences	2016-2022
34	Large garden style apartment complex, NWC Cortaro/I-10	2018
34	Marana Senior Center, 100,000 sq. ft. assisted care facility	2017
34	Silverbell Gateway Development	2016-2018
36	Tangerine Business Park, 70 acre commercial/industrial	2017-2020
36	Marana Technology Park, 24 acre commercial/industrial	2017-2020
36	Various subdivisions, 2,400 single family residences (SFR's)	2016-2025
36	Tangerine Commercial Park	2017-2020
37	Various subdivisions, 1,350 SFR lots	2016-2020
37	Urgent care center	2016
38	Commercial development - five story hotel, 2-3 restaurants	2017
38	Auto mall and big box retail store	2018-2020
38	100,000 sq.ft. assisted living facility	2018
38	Various subdivisions, approximately 1,300 SFR lots	2016-2022
39	Various subdivisions, approximately 900 SRF lots	2016-2027
39	Urgent care center	2016
37/38	Cascada Master Plan Development, 4,960 SFR development	2017-2027

This information indicates that the overwhelming majority of growth will occur in the North Battalion. Station 37's area will have the most growth in the short term, followed by stations 36, 38, and 34 first-due areas. The completion of the Tangerine Road widening project in 2018 (discussed further on page 18 of this section) is also expected to accelerate commercial growth in Stations 37 and 39's first-due area.

A slower development pace with generally smaller projects is expected in the South Battalion. Should another recession occur in the near future, as some economic models indicate, this expected growth in both battalions would likely be affected significantly.

General Description of Occupancies

The dominant occupancy type in NWFD is the single family residence (SFR). These can range in size from less than 1,000 square feet in the District's higher density population areas to residences that exceed 10,000 square feet in the Tucson and Tortolita Foothills areas. Most of the SFR's in the District are of relatively new construction, less than 40 years old. The District also has a substantial number of residential mobile homes and multi-occupancy apartment complexes.

Commercial occupancies are varied, from small stand-alone occupancies to large malls and big-box type retail centers. Small to medium strip malls and business park style occupancies are the most common type of commercial and business occupancies. There are a number of medium size, chain-type motels/hotels and two large scale resorts in the District. There is a concentration of light industrial occupancies along Interstate 10 between Ina and Cortaro Roads, with some additional light industrial occupancies located mostly in the South Battalion of the District.



Tucson Premium Outlets – Marana Center, the largest retail mall in NWFD.



Service Type Infrastructure

There are two major petroleum pipelines in NWFD that run parallel to Interstate 10. In addition, there is a large diameter natural gas line that runs through the western portion of the District. There are two major propane businesses in NWFD that have very large storage capacity. Both businesses are in a predominantly industrial area of the District.

There are several high-voltage (>138 KV) electrical transmission lines that traverse through the District, along with several substations located at various locations. The locations of these energy related infrastructures are documented and available to Operations personnel. The largest waste treatment facility in the metro Tucson area is located in NWFD. The Tres Rios Waste Water Reclamation Facility is capable of treating up to 50 million gallons of effluent a day. There are numerous communication towers and facilities located throughout the District, including key communication facilities located atop the Tucson Mountains.

Transportation Infrastructure

The major transportation infrastructure feature within the District is Interstate 10 which traverses the District in a north-northwest/south-southwest direction and totals approximately 21 miles within NWFD. Additionally, State Highway 77, is a divided median six-lane highway that runs north-south along the District's east side. The remainder of the vehicle transportation infrastructure consists of major arterial roadways, with associated residential streets. Many of the major roadways support bicycle lanes or paths. The majority of the residential streets in NWFD are not laid out in a typical grid pattern, but in a less conventional manner with many of the streets not continuing directly through a neighborhood and include many cul-de-sacs.

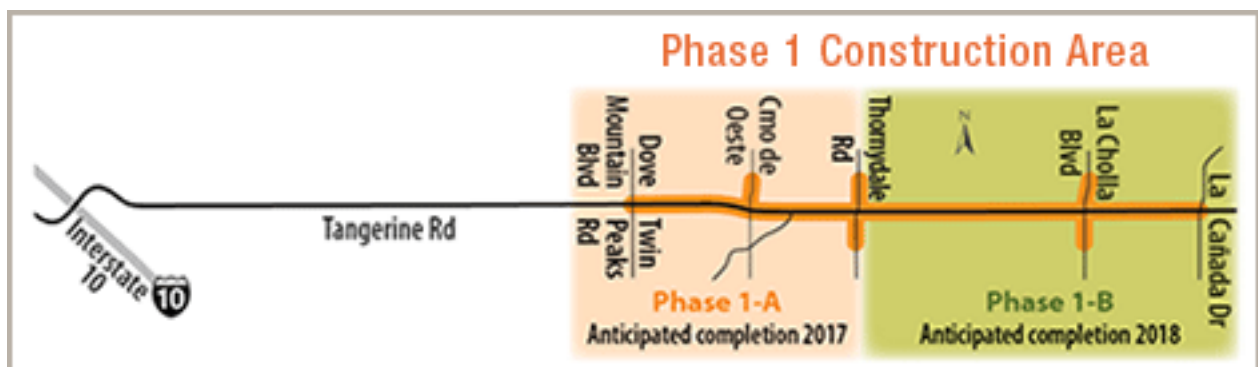
Major arterial roadways west of the freeway are few and far between, and several do not have engineered storm water systems. These, and several other primary roadways throughout the District, are susceptible to seasonal flooding which can make them impassible for short periods of time, ranging from less than an hour to several hours. There are also a few roadways and long private driveways in the foothill areas of the District that are challenging for apparatus access.

There is a transcontinental railroad owned and operated by Union Pacific that parallels Interstate 10. Train traffic averages approximately 30 to 40 trains per day. Amtrak also operates two passenger trains that pass through the District three days a week. There are five major arterial road at-grade railroad crossings that can cause response delays. This issue is further discussed in Section 3.

A large scale construction project on Interstate 10 that began in August 2016 is further described in Appendix 1.C. The project, which is expected to last two years, will have an impact on NWFD like no other construction project before. The dominant factor will be the closing of Ina Road at Interstate 10 during the construction period, which will prevent access across the freeway at this point. The impact is significant in that Ina Road is one of the three major roadways that provides access to the developed areas west of Interstate 10 from the District's infrastructure hub on the east side. This challenge will be further amplified by the resulting additional traffic on the surrounding arterial roadways, which are already in near their designed capacity. This closure of Ina Road is scheduled to take place in early 2017 and is expected to last at least a year. An Operations Task Group has been formed to determine the impact on the performance objectives listed in this document, and to develop service delivery alternatives.



A second large construction project is underway on a major east-west arterial roadway on the District's north side. The Tangerine Road widening project is expected to be completed in 2018, and will eliminate many of the seasonal flooding issues that occur on this roadway. This, along with the divided feature of the roadway will contribute to better response times in this area.



A third road widening construction project is scheduled to begin in the spring of 2017, that when completed will also contribute to better response times. The Cortaro Road widening project in Station 38's area is scheduled to be completed in late 2018. This project unfortunately will have overlap with the Interstate 10 project, contributing to the challenge of maintaining response time standards during the construction period of both projects.



When completed in the Spring of 2017, the Sunset Road Bridge will provide an additional all-weather crossing over the Santa Cruz River.

Section 2

Description of NWFD Programs and Services

Northwest Fire District provides a wide array of programs and services that are reflective of its all-hazard response approach. The District provides two distinct levels of programs and services to its residents, businesses, and visitors - prevention (proactive) and emergency response (reactive) programs and services.

Prevention & Safety Services

The Prevention and Safety Division provides all aspects of a full service fire prevention program that is in accordance with NFPA 1201, Standard for Providing Fire and Emergency Services to the Public, Chapters 5, 6, and 7. The program includes code enforcement of existing occupancies, plan review, public education, and fire investigation.

Programs provided to the public as part of NWFD's community risk reduction efforts are provided in Figure 2.1.



Additional Non-Emergency Services

NWFD also provides other non-emergency services that include:

- Hazardous reptile removals
- Smoke/CO detector battery replacement
- Invalid assists
- Community Assistance Program (CAP) that aids victims and family members following a traumatic event such as a fire or death.



⁵ Reptile removal is limited to responding to reptiles that are in a residence or an enclosed area that prevents the reptile from escaping and presents an imminent threat to people.



Figure 2.1
Prevention & Safety Services public delivery programs

Program Title	Description	Frequency
New Construction Plan Review	Construction plans for all projects within the District, including new buildings and existing tenant improvements are reviewed for code compliance and hazard abatement prior to the start of construction.	As needed.
Code Compliance Inspections	Occupancy code compliance inspections are conducted by certified NWFD fire inspectors.	Dependent on risk level of occupancy (high, moderate, or low), every 1-3 years.
Fire Investigation	Fires are investigated by certified NWFD arson investigators.	As needed.
Fire Safety House	The multi-feature trailer is used to instruct children on various fire safety aspects.	Special events on request and incorporated at all mini-musters.
Mini-Musters	2 nd grade participation in various outdoor events designed to teach numerous fire safety lessons.	Once a year each October for all elementary schools within the District.
Elementary School Classroom Fire Safety Education	2 nd and 4 th graders are provided fire safety education.	Once a year in all elementary schools in the District.
Infant/Child Car Seat installation	Performed by certified staff at Administration/Prevention Offices.	By appointment each Tuesday and Thursday.
Babysitting Classes	16-hour class includes basic childcare skills and CPR instruction for infants/small children.	Each summer, six two-day classes.
Fire Extinguisher Training	Provides CFR 1910.157 – Portable Fire Extinguisher compliant training for individuals and businesses using a state of the art simulator.	As requested.
CPR Training	Certified training provided through a third party vendor. Hands-only CPR training directly delivered by NWFD personnel.	As demand dictates.

Fire Suppression

Northwest Fire District provides fire suppression services for all types of fires. In general, NWFD follows NFPA 1710, Organization and Deployment of Fire Suppression Operations by Career Fire Departments, 2015 Edition, Chapter 5 regarding fire suppression services including staffing and deployment. Operations personnel qualifications for firefighter through battalion chief are listed in Appendix 2.A.



Fire services are managed under the Operations Division by a deputy chief who supervises six shift battalion chiefs. Fire suppression services are provided from ten fire stations that house 11 four-person engine companies, including one peak activity company⁶, two cross-staffed ladder companies, and five two-person rescues. Available ancillary apparatus include two tenders, a light attack aircraft rescue firefighting (ARFF) apparatus, equipment (air/light/salvage) truck, and rehab truck. An incident command vehicle is also available to respond to and assist with the management of larger incidents. All engine, ladder and tender apparatus meet NFPA 1901, Standard for Fire Apparatus, and FEMA Resource Type I requirements.

Emergency Medical Services (EMS)

NWFD provides a very high level of emergency medical services that are based on proven advanced technology and evidence based processes and procedures. Formal oversight of the program is provided by Banner/University Medical Center, a Level 1 Trauma Center and nationally recognized medical research facility.

The District's EMS Deputy Chief (DC) is responsible for the overall supervision, operational readiness and effectiveness of medical operations and administration within the District. In addition to District-specific responsibilities, the EMS Deputy Chief also has regional responsibilities which include participation in pre-hospital care committees and liaison duties with the District's Medical Director at Banner/University Medical Center.



⁶ One engine company, EN342, is staffed Tuesday through Friday, 0800 hrs to 1800 hrs.



Shift EMS Captains, who report directly to the EMS DC, are responsible for oversight of EMS operations on a 24/7 basis across both battalions (north/south). They oversee the EMS activities of paramedics and EMTs⁷ for their assigned shift and function as a direct liaison to all hospitals in the region. EMS Captains have several key responsibilities:

- Represent each shift as the infectious control officer
- Provide quality assurance review of patient care reports
- Assist with EMS training
- Incident safety officer on major incidents (all types)

All companies including engine, ladder, and rescue companies, are staffed with a minimum of one paramedic. The balance of staffing is at the EMT level or above. NWFD has an Advanced Life Support (ALS) Certificate of Need⁸ (CON) for patient transport to hospitals. The CON is an Arizona Department of Health Services License that allows for transportation and cost recovery for ALS ambulance service. NWFD staffs five 2-person (paramedic and EMT) rescue companies to provide this service. Basic Life Support (BLS) ambulance services are provided by Southwest Ambulance (SWA) on a contractual basis. Currently, there are three SWA BLS ambulances assigned to NWFD that are strategically located at three fire stations in the District.

NWFD is a participant in the regional Metropolitan Medical Response System⁹ (MMRS) program and has a well-equipped mass casualty truck to respond to mass casualty events, both in the District and the region.

Special Operations – Hazardous Materials and Technical Rescue

Northwest Fire District provides emergency services for all types of hazardous materials and technical rescue emergencies. All shift personnel are trained at a minimum to the Operations level in hazardous materials and technical rescue. There are also 41 personnel trained to the Technician or Specialist level as defined in *NFPA 472, Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*. These technicians and specialists comprise the NWFD Hazmat Team. The Hazmat Team is classified as a FEMA Type II resource. The team participates as members of the Pima Regional Hazmat Team, comprised of several regional fire districts and departments.

⁷ Paramedics and EMTs are certified in accordance with Arizona Department of Health requirements.

⁸ Arizona Revised Statutes §36-21, 22 and Arizona Administrative Code Title 9, Chapter 25, Article 9-12.

⁹ The mission of the federally backed Metropolitan Medical Response Systems to enhance local medical incident management's ability to coordinate and respond to a mass casualty event during the crucial first hours, until significant external resources arrive and become operational.

The same 41 Special Operations team members are also cross-trained to the technician level in accordance with applicable sections of NFPA 1670, Operations and Training for Technical Search and Rescue Incidents. The Special Operations team participates as part of the Pima Regional Technical Rescue Team. Like the Pima Regional Hazmat Team, this team is comprised of several regional area fire districts and departments, as well as the Pima County Sheriff's Department.



Minimum daily staffing is eight cross-trained hazmat/TRT technicians housed at Stations 33 and 34. There are two large, well equipped special operations apparatus, one located at Station 33 (HZ333) and one at Station 34 (SQ334).

Wildland Fire

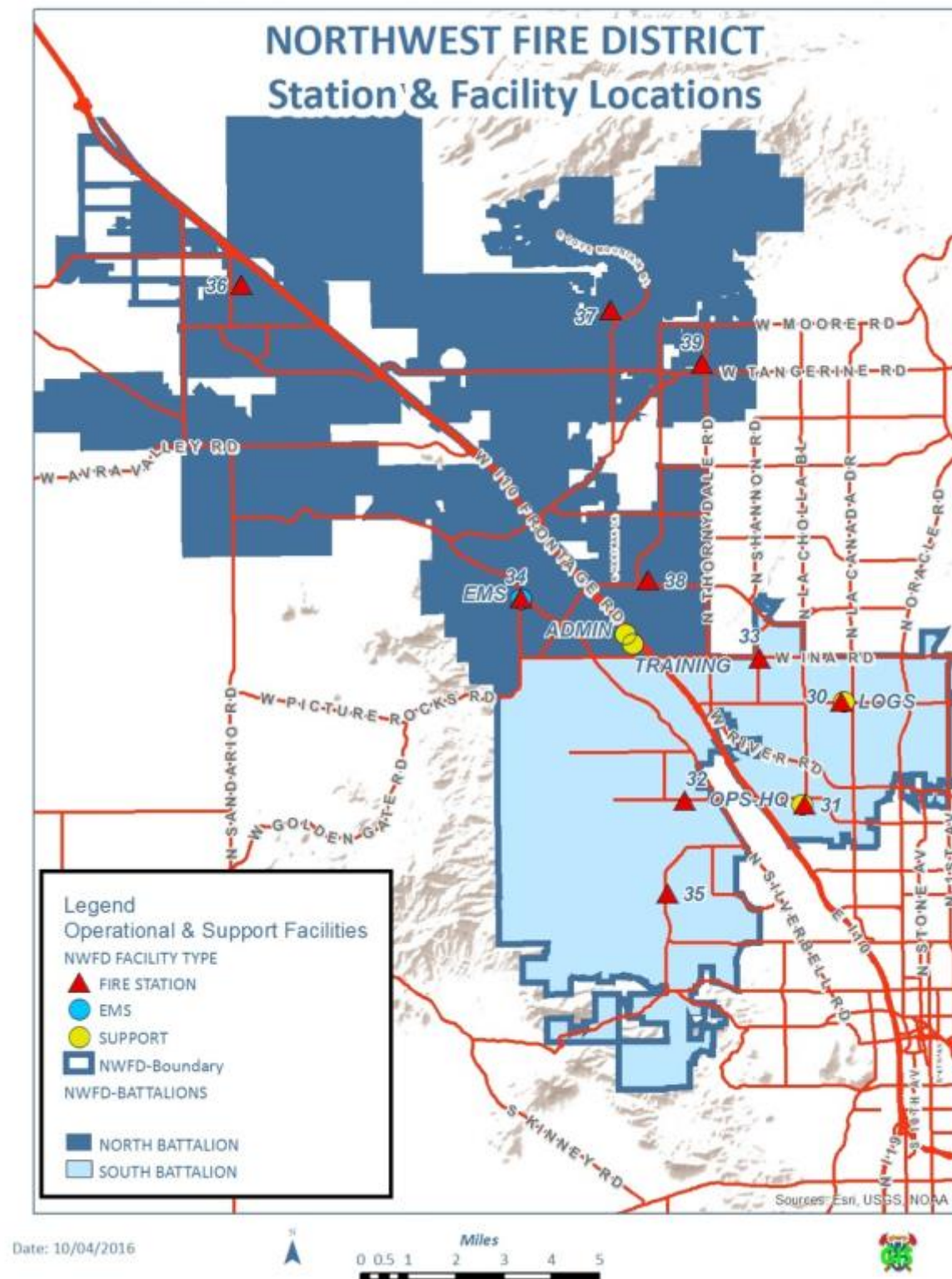
The Wildland Fire services program is overseen by a qualified, wildland fire experienced shift battalion chief. All Operations members are trained at minimum to the NWCG S-130/S-190 basic wildland firefighting level. Each member is provided with wildland firefighting PPE that meets NFPA 1977, Protective Clothing and Equipment for Wildland Fire Fighting and each apparatus is equipped with appropriate wildland firefighting equipment that is appropriate for its mission. The District staffs as necessary, one Type 6 and two Type 3 wildland fire apparatus. In addition, 23 members have wildland specific NWCG qualifications at the single resource boss level or higher. An overview of the associated resources and staffing regarding all emergency services provided by NWFD can be found in Section 4, Figure 4.18.



Fire Station Locations

NWFD provides services from ten fire stations, the locations of the fire stations are presented in Figure 2.2. The stations and other support facilities are described in more detail in Section 4.

Figure 2.2





Section 3

All-Hazard Risk Assessment of the Community

Hazards, in the context of this document, are any dangerous conditions with the potential to cause harm to people and loss to property, including fires, medical emergencies, the release of hazardous materials, entrapments, and other natural and man-made hazards. NWFD has the responsibility of responding to emergencies associated with these hazards, and the associated risk is the level of exposure to a hazard. Risk can also be defined as an estimate of the probability of a hazard related incident occurring and the severity or harm or damage that could result¹⁰. Associated *risk management* is defined as the identification and evaluation of risks, and the development, selection, and implementation of control measures up front to lessen the probability of a harmful consequence¹¹.

NFPA 1600, Standard on Disaster/Emergency Management and Business Continuity/Continuity of Operations Programs, defines risk assessment in the following way:

A process for identifying potential hazards/risk exposures and their relative probability of occurrence; identifying assets at risk; assessing the vulnerability of the assets exposed; and quantifying the potential impacts of the hazard/risk exposures on the assets. Periodic reassessment is needed when changes to the entity occur. Reassessment is also necessary because hazards/risk exposures change over time, and the collective knowledge of hazards/risk exposures develops over time.

It is important to note that there is always “residual risk”; it is not possible to eliminate all risk. The public’s tolerance of risk, as well as the elected Governing Fire Board members and senior management’s perspective of risk, determine the allocation of risk and the acceptable level of residual risk to the community. This is frequently accomplished through a risk-benefit/cost analysis and is directly tied to the resources that are available to reduce risk.

NWFD completed a comprehensive community risk assessment in summer of 2016 to determine what the risks are in NWFD, their potential impact on the community, and the levels of risk. In turn, the varying levels of risk were analyzed to assist the District in identifying where and how to assess the current distribution and concentration of resources, in terms of the types and numbers needed to respond effectively to likely emergencies. NWFD has chosen to follow two credible risk assessment processes. The first is utilizing the United States Fire Administration approach¹² to developing a successful risk management plan:

1. Risk Identification
2. Risk Evaluation
3. Risk Control Techniques
4. Risk Management Monitoring

¹⁰ Manuele, Fred A (2008). Advanced Safety Management. Hoboken NJ: John Wiley & Sons. p.113

¹¹ Graham, Gordon. www.firenuggets.com

¹² Risk Management Practices in the Fire Service. Federal Emergency Management Agency, US Fire Administration, 1996.



The first three risk management components are addressed in this Section; the approach to risk management monitoring is addressed in Section 6, Plan for Maintaining and Improving Response Capabilities.

NWFD has also incorporated guidelines from the *CFAI Community Risk Assessment: Standards of Cover 6th Edition* that outlines a four-step process regarding risk assessment methodology:

1. Identify the risk
2. Assess the risk
3. Categorize the risk
4. Classify the risk

Unique Risk Factors Associated with NWFD

When analyzing risk assessment and developing response performance goals, consideration must include many subjective and objective factors that are unique to an organization. These include, but are not limited to, population density and demographics, political and legal realities, weather and topography, water supply and transportation system components.

Population Density/Demographics

As identified in Figure 1.5 in Section 1, NWFD serves a wide array of population densities, ranging from many square miles of virtually uninhabited area to areas that exceed the U.S. Census Bureau for the definition of urban density - greater than 2500 population per square mile. During the past two CRA-SOC processes of analyzing population density at NWFD, only a very small area of “urban” density was identified. During this community risk assessment process, a more comprehensive and detailed GIS program was utilized. That, in combination with a net population growth of six percent in the past five years, contributed to identifying nearly 15 square miles of urban density population during this Community Risk Assessment-Standard of Cover process. This is relevant to assessing risk, as higher demand for emergency services generally can be associated with high-density concentrations of population.

Population data for two EMS and fire at-risk population age groups was acquired; under 5 years old and over 65 years old. This information is presented in Figure 3.1.

Figure 3.1

At Risk Population		
Area	Under 5 Years Old	Over 65 Years Old
Unincorporated Pima County	3%	7%
Town of Marana	8%	17%



Multiple Jurisdictions

Relatively unique when compared to municipal fire departments, NWFD serves two different jurisdictions; unincorporated areas of Pima County and the Town of Marana. Maintaining an effective relationship with these two entities and ensuring NWFD has clear expectations from each regarding the delivery of emergency services and the associated level of risk is a key element to providing services to meet the identified risks in both jurisdictions.

Transient Populations (Students, Seasonal Residents, Tourists)

NWFD experiences an increase in population during the winter months due to tourism and a sizeable winter resident population. To a lesser extent, during the University of Arizona academic year there is an increase in student population. Data regarding these population classifications is not readily available; however, the service impact of these populations is currently minimal as the call per month graphs on page 127 in Section 4, Current Deployment and Performance indicates.

Adjacent Areas without Fire Protection

There are several adjacent areas that are not part of NWFD but are essentially surrounded or border NWFD. To date, residents and property owners in these areas have opted not to be part of a fire district, and as such technically have no fire service. NWFD has responded to these areas following adopted policy. The data for these responses is listed in Figure 3.2. The locations of these responses are located in Figure 3.3.

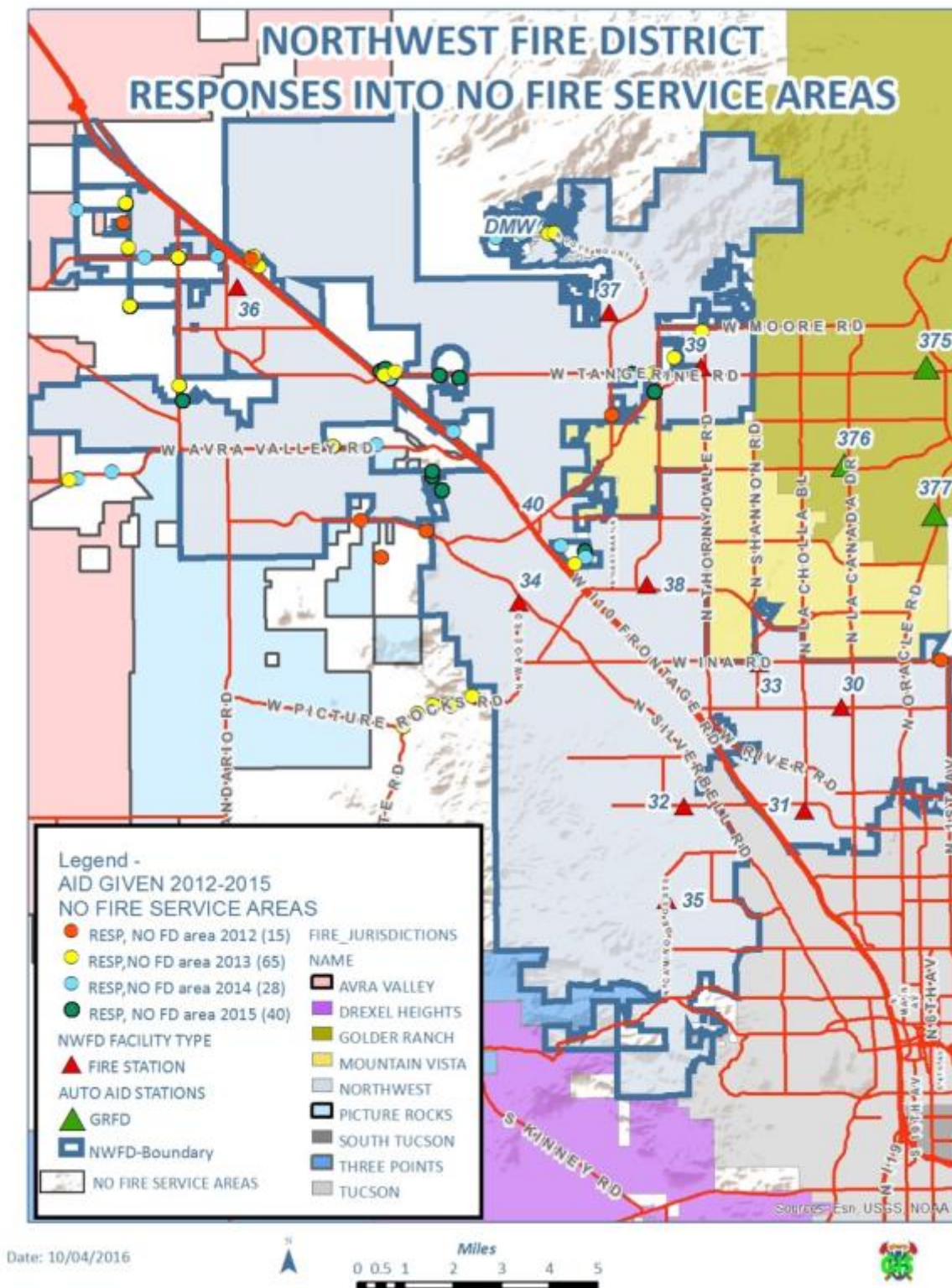
Figure 3.2

Year	Responses to areas not in a fire district service area*
2012	15
2013	67
2014	30
2015	40

*Responses into a non-service area are billable.

While the call volume to these areas is relatively low, it does represent an increased level of risk to NWFD members as well as increased exposure to the District. NWFD will continue to closely monitor the frequency and severity of the types of calls in these areas.

Figure 3.3



Emergency medical services in these non-service areas is provided by Southwest Ambulance under the provisions of their Arizona Department of Health Certificate of Need. Pursuant to Fire Board action (Resolution 2011-003), it is the policy of the Northwest Fire District not to respond into areas that are not covered by other fire agencies, or areas that choose not to annex into a fire agency, with the following exception(s):

- Requests by law enforcement to respond to roadway vehicle accidents requiring extrication.
- Wildfire incidents that threaten Northwest Fire District jurisdiction.
- If there is a known imminent threat to life.

Geological/Geographical Hazards

The primary hazards associated with the area geology and geographical features include:

- Flooding.
- Subsidence due to groundwater extraction.
- Potentially damaging soil properties including expansive and collapsing soil types.
- Debris flow and rock falls associated with the two identified mountain ranges.

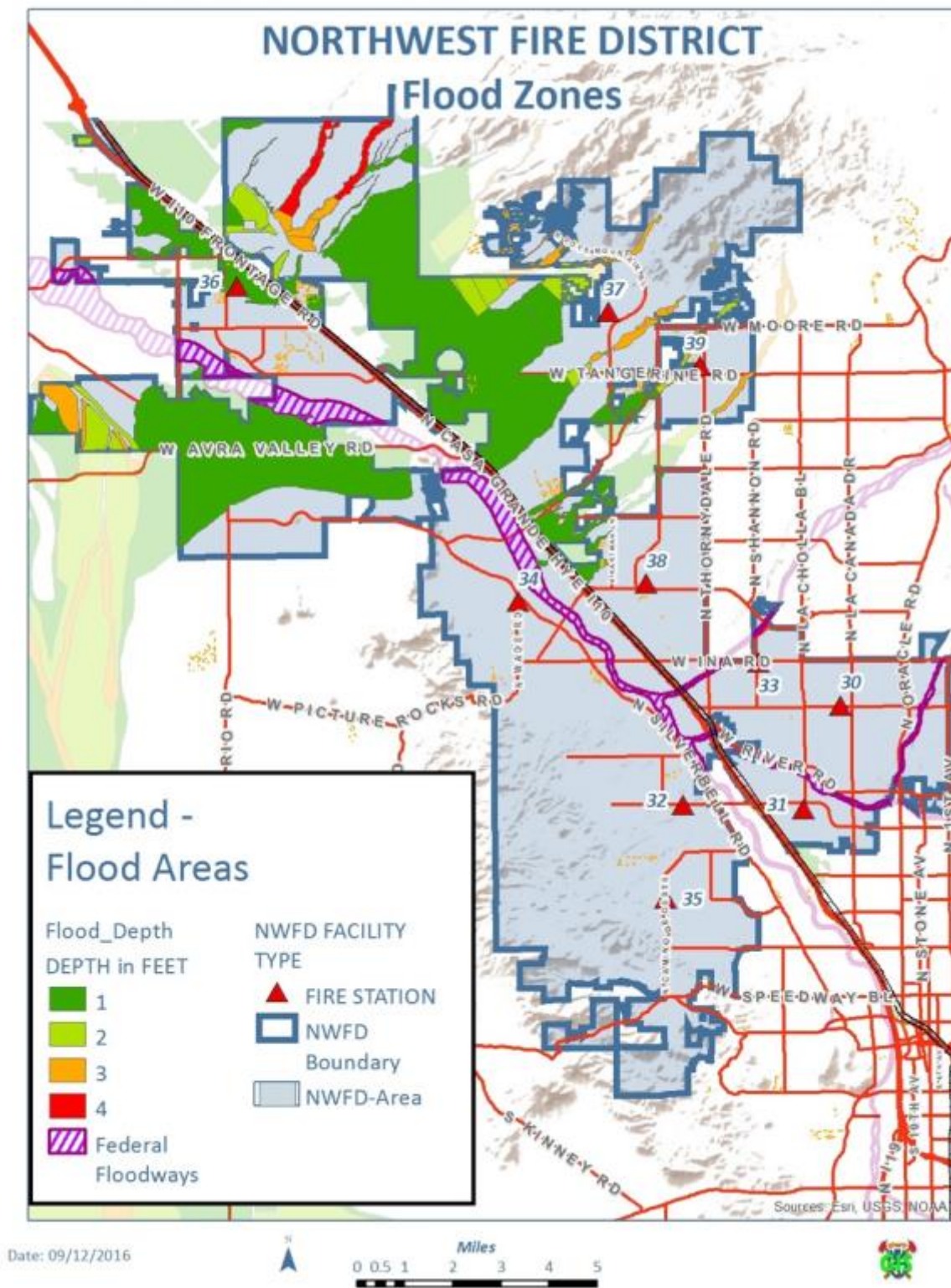
Flooding

All but the first hazard listed represent relatively minimal risk to life safety from a frequency and consequence risk perspective. Areas susceptible to flooding are presented in Figure 3.4. The most prominent flood feature is the Santa Cruz River (see photo below), which is further discussed later in this section as a large-scale risk.



Santa Cruz River looking north from the Cortaro Road Bridge.
The Continental Ranch Neighborhood is on the left.

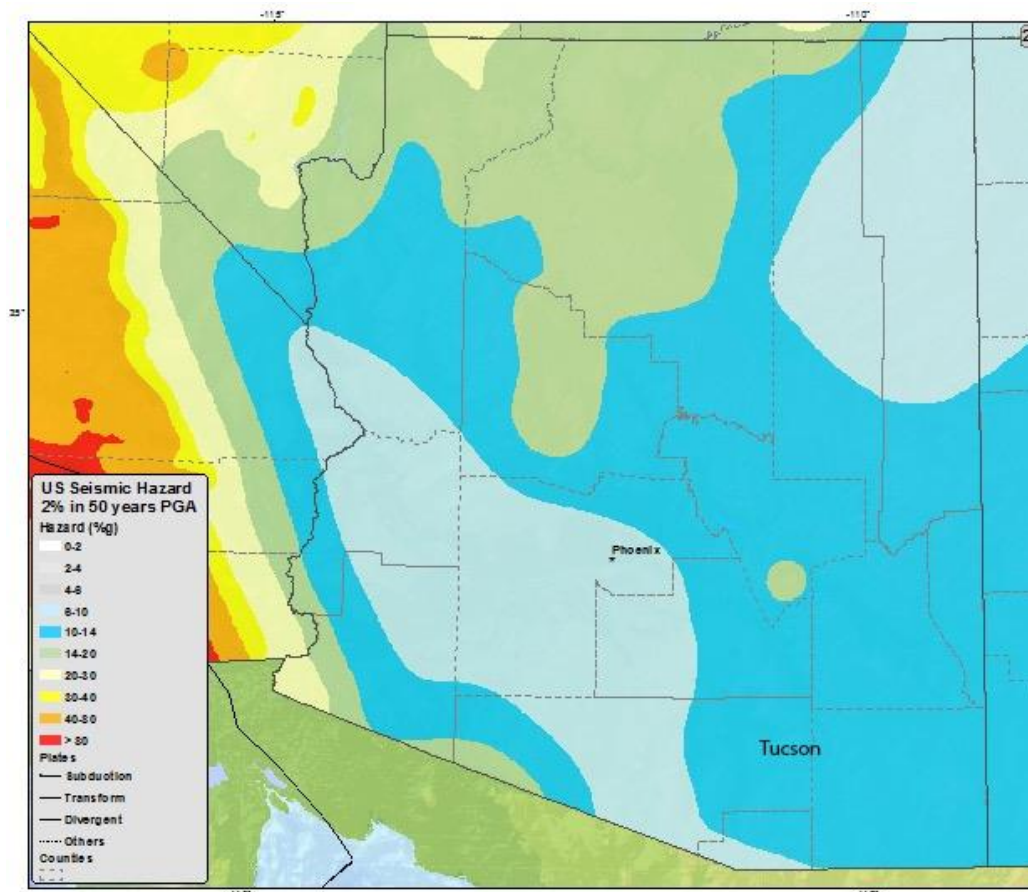
Figure 3.4



Earthquake Potential

The earthquake potential and associated risk in NWFD is minimal. FEMA classifies the region as a seismic design Category B, the second lowest risk rating. Figure 3.5 from the United States Geologic Survey also indicates a relatively low risk of earthquakes for the area (NWFD is located in the teal colored zone). The closest last major earthquake (7.4 magnitude) occurred in 1887, approximately 130 miles to the southeast in Sonora, Mexico. Newspaper accounts reported that the earthquake caused numerous large boulders to roll down the nearby Catalina Mountains, causing a large wildfire. Some minor structural damage in the Tucson area also was reported. While the earthquake risk is classified as minimal, there is a relatively large fault, known as the Santa Rita fault that is located along the northern base of the Santa Rita Mountains located approximately 35 miles south of NWFD. This fault has been identified in some research sources as having the potential of an earthquake of up to a 6.5 magnitude. The probability of an earthquake along this fault is low, based on historical activity. However, as with most predictive earthquake models, there is a relatively low degree of confidence.

Figure 3.5



Source: USGS website, <http://earthquake.usgs.gov/earthquakes/byregion/arizona-haz.php>

Water Supply

The vast majority of the urban/suburban developed area of NWFD has adequately spaced hydrants. This is generally defined as a hydrant within 1,000 feet of a commercial or residential occupancy, with a minimum flow of 1,000 gallons per minute (gpm). Areas that have occupancies greater than 1,000 feet from a fire hydrant are typically on large lots in low density areas. Hydrant locations are shown in Figure 3.6. Figure 3.7 shows the areas that are not within 1,000 feet of a hydrant and require water supply by less conventional means. One method is relay pumping¹³, a process that uses large diameter supply lines and adequately spaced engines to pump the supply lines, or by using water tender shuttles that bring the water directly to the scene from a reliable water source. both methods of water delivery take longer to develop than using a conventional hydrant supply, thus increasing the risk in these areas. Areas without hydrants are identified on electronic response maps both at the dispatch center and responding units. These areas receive a tender on the initial dispatch as part of the effective response force.

Maintenance of the fire hydrants is the responsibility of the water entities; however, none of the water entities perform regular inspection functions at a level required by the Insurance Services Organization. As a result, NWFD performs this function annually (completed by first-due companies) for each hydrant within the District. This takes a substantial amount of District resources each year. Flow capabilities vary widely with each entity.



Tender shuttle drill at NWFD Training Center.

¹³ Relay pumping operations are designed for a distance up to approximately 3000' from the nearest hydrant.

Figure 3.6

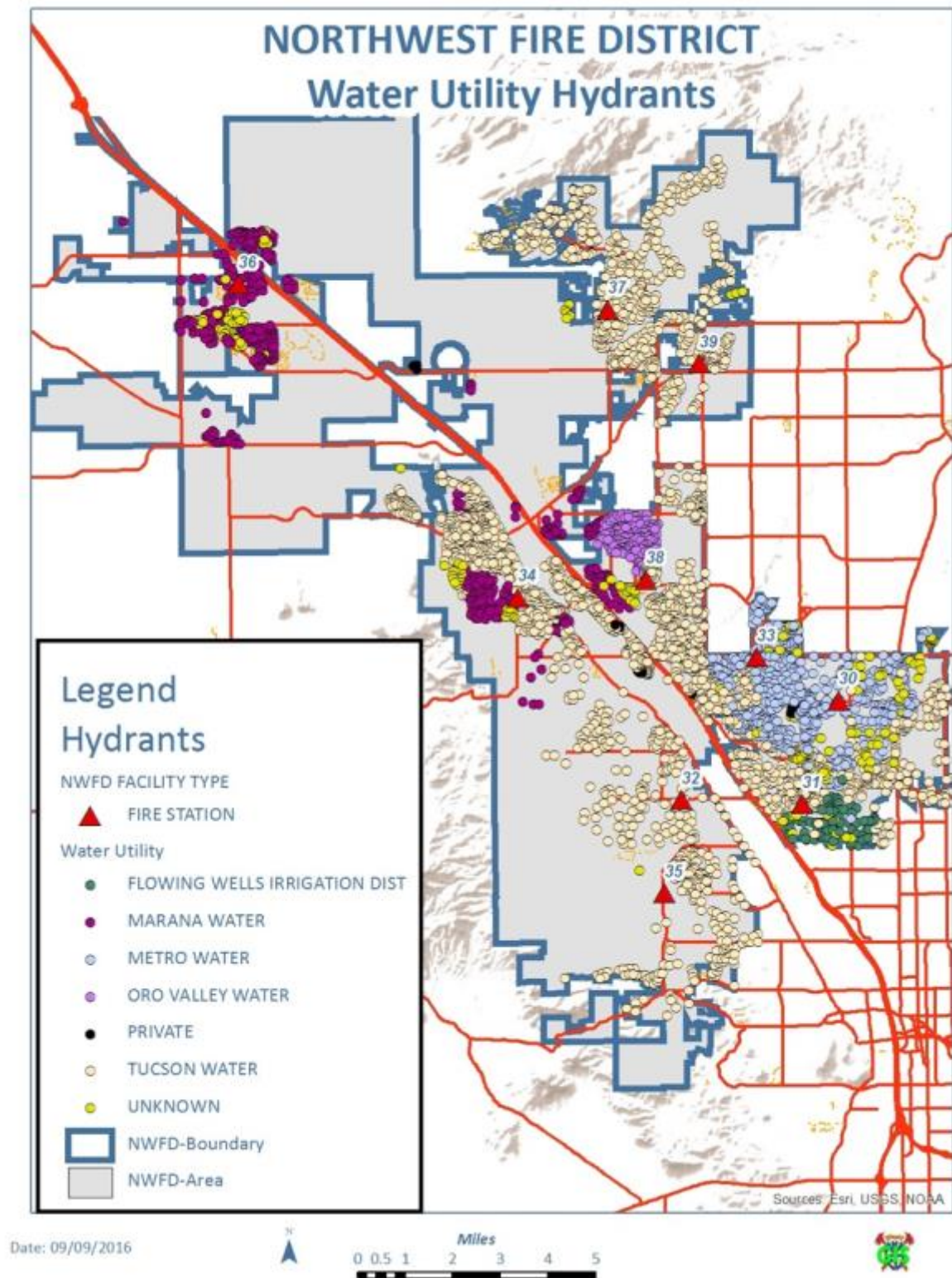
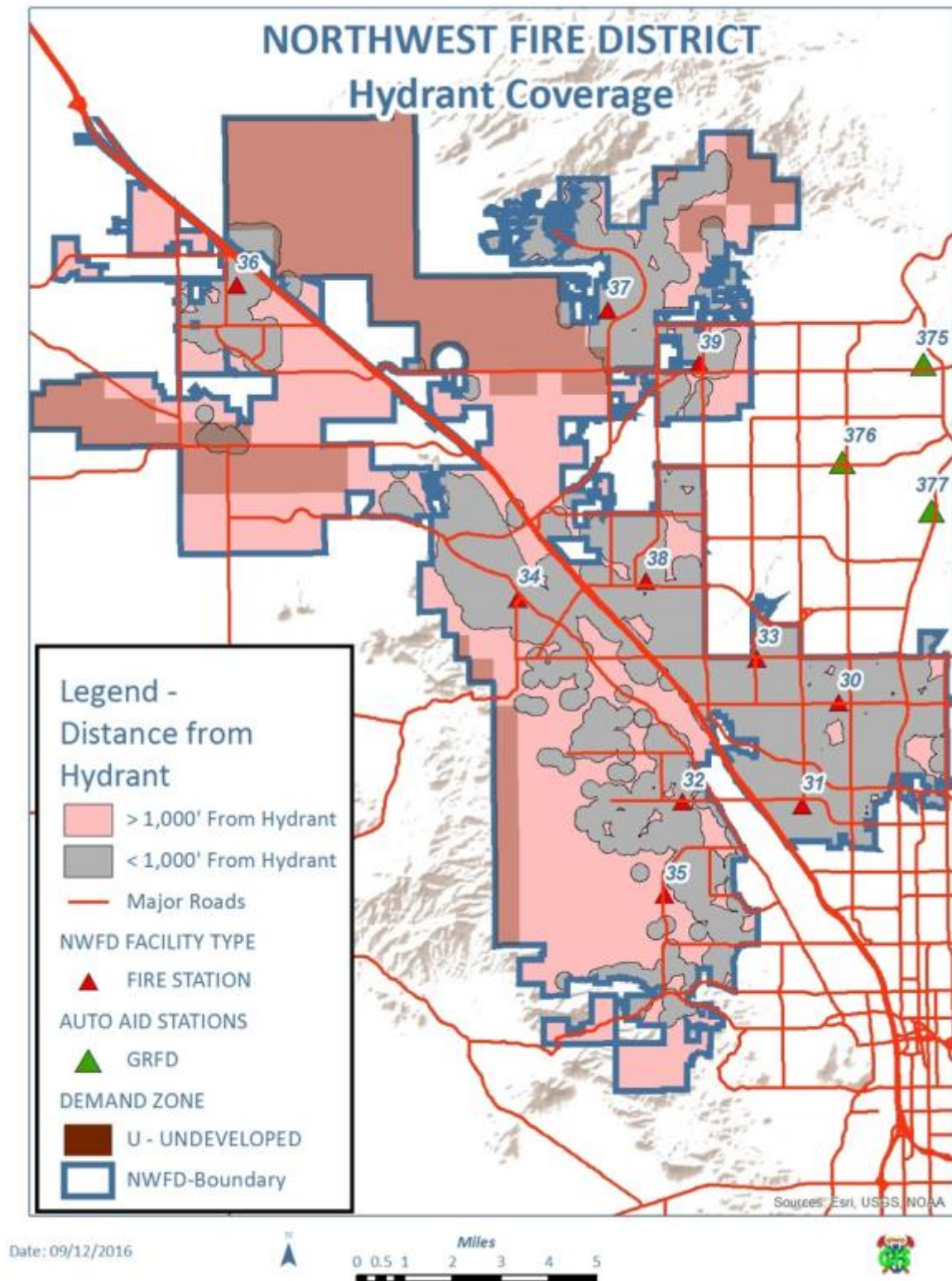


Figure 3.7





Transportation System Associated Risks

Several significant transportation system elements are present in NWFD that can contribute to risk and delayed emergency responses.

Transcontinental Railroad

A transcontinental railroad traverses the District. In 2014, a new parallel track was constructed for increased capacity. Approximately 30-40 trains travel through the District daily, the length of these trains can exceed over one mile. Four of the six primary crossings are at major arterial roadways that can cause delays in emergency response. Figure 3.8 illustrates the location of the at-grade crossings. The current Ina Road/I-10 construction project will eliminate the at-grade crossing at this location and there are future plans in the next four to six years to construct two more overpasses that will significantly reduce train related delays.

Santa Cruz River

The Santa Cruz River traverses approximately 18 miles in the District, flowing in an unusual south to north direction. It represents a significant geographical barrier for NWFD as there are only five bridges that span the river. The bridges are spaced at substantial distances, often making for less than optimal response routes. An additional bridge crossing (Sunset Road) will be completed in the first quarter of 2017 improving access across the river in that area of the District.

Roadways Without Drainage Management Systems

Many of the moderate volume arterial roadways and primary subdivision access roadways lack storm drain systems to carry roadway runoff. Culverts are also often lacking to manage drainage from washes that cross the roadways. Following large amounts of rainfall, often occurring in a short period of time, these roadways can become impassible. Compounding the issue, there are often no alternate means of gaining access to an incident when these conditions exist.

Roadway Network

The general lack of a centralized, grid-style street pattern typically found in municipally served fire departments adds significant travel time to responses. This effect is greatest in the Tucson and Tortolita Mountains foothills area of the District where the winding road system often includes dead ends, contributing to longer response times.

New Subdivision Roadway Trends

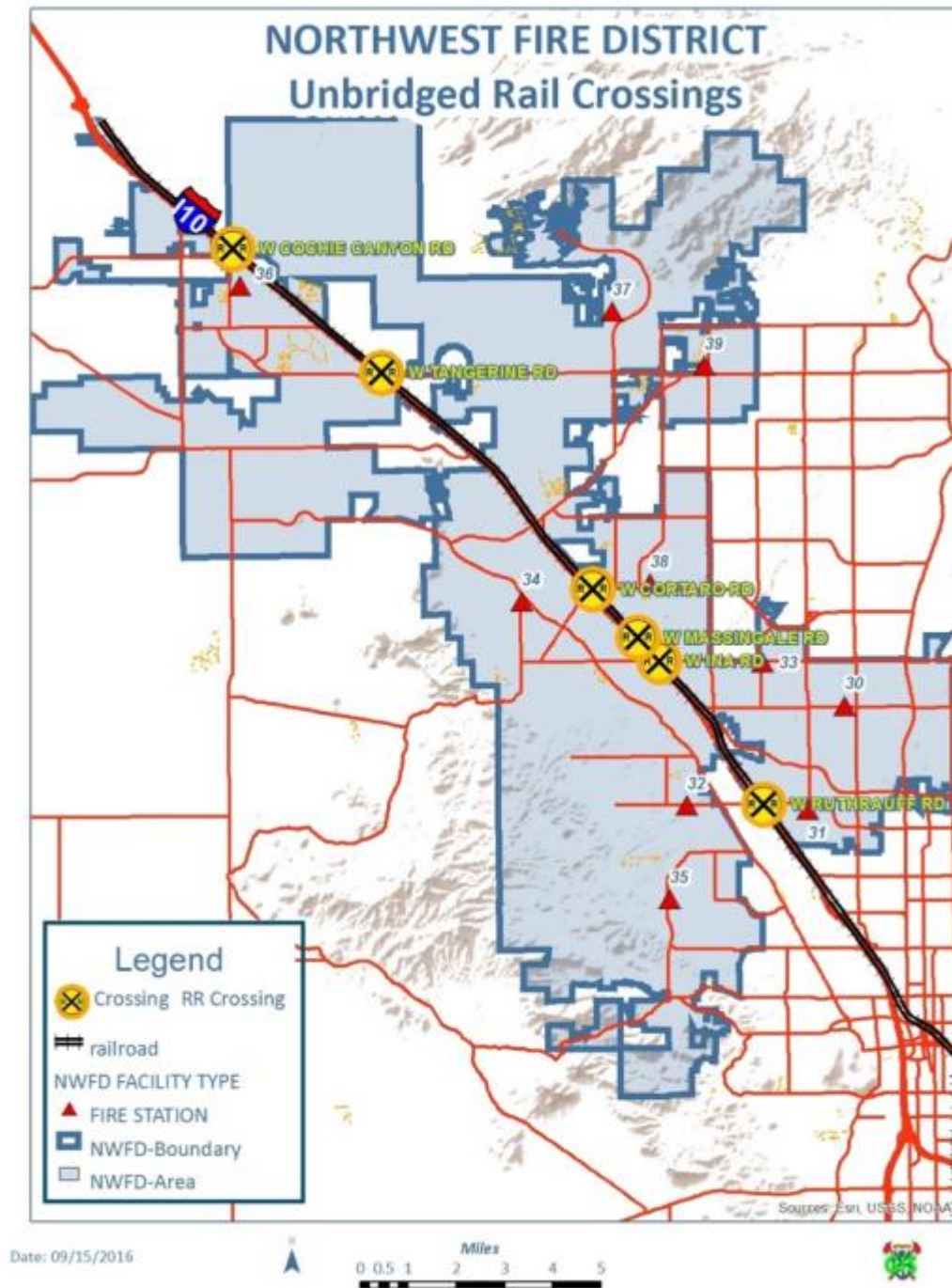
Trends identified in subdivision roadway design/access are also contributing to slower response times that include:

- Traffic calming devices (speed humps/bumps)
- Increasing use of subdivision and residential access gates. Although most of the access gates can be operated via the apparatus' Opticom system, the entry gates still cause a delay in emergency response.
- Increasing use of roundabout style intersections in new subdivisions.

Ina Road/I-10 Construction Project

As discussed in Section 1, a large-scale, two-year construction project currently getting underway that involves the Ina and I-10 interchange and adjacent areas will significantly challenge emergency services to the area directly affected by the construction as well as affecting access on either side of the interstate normally accessed by Ina Road.

Figure 3.8



Creation of Geographical Planning Zones (GPZ's)

The previous editions of the Standard of Cover have included two Demand Zones (see Section 4, Current Deployment and Performance) that were developed based on the urban/suburban area (Demand Zone A) and another for the rural area of NWFD (Demand Zone B). Their primary purpose was to establish a mechanism for response time standards.

While maintaining the two demand zones concept in this CRA-SOC third edition, the District has taken the opportunity to create more detailed geographical planning zones to enhance the risk assessment process and to provide a more detailed analysis of response times. Ten GPZ's were created based on station first-due areas. The zones were analyzed taking into account the following factors:

- Topographical and geological features
- Transportation elements such as roadways and the railroad
- Occupancy type
- Population density
- Risks associated with EMS, fire, hazmat, TRT and wildland fire

The boundaries for the ten first-due GPZ's are defined in Figure 3.9. The individual GPZ's are further described on pages 42-61. Moving forward, additional information regarding the planning zones' characteristics will be obtained and analyzed to help develop prevention programs and enhance the emergency response model.



Interstate 10, Kinder-Morgan petroleum product pipelines, UPRR railroad, and high voltage transmission lines are some of the key risks identified along Stations 34's and 38's first-due boundary.

Figure 3.9

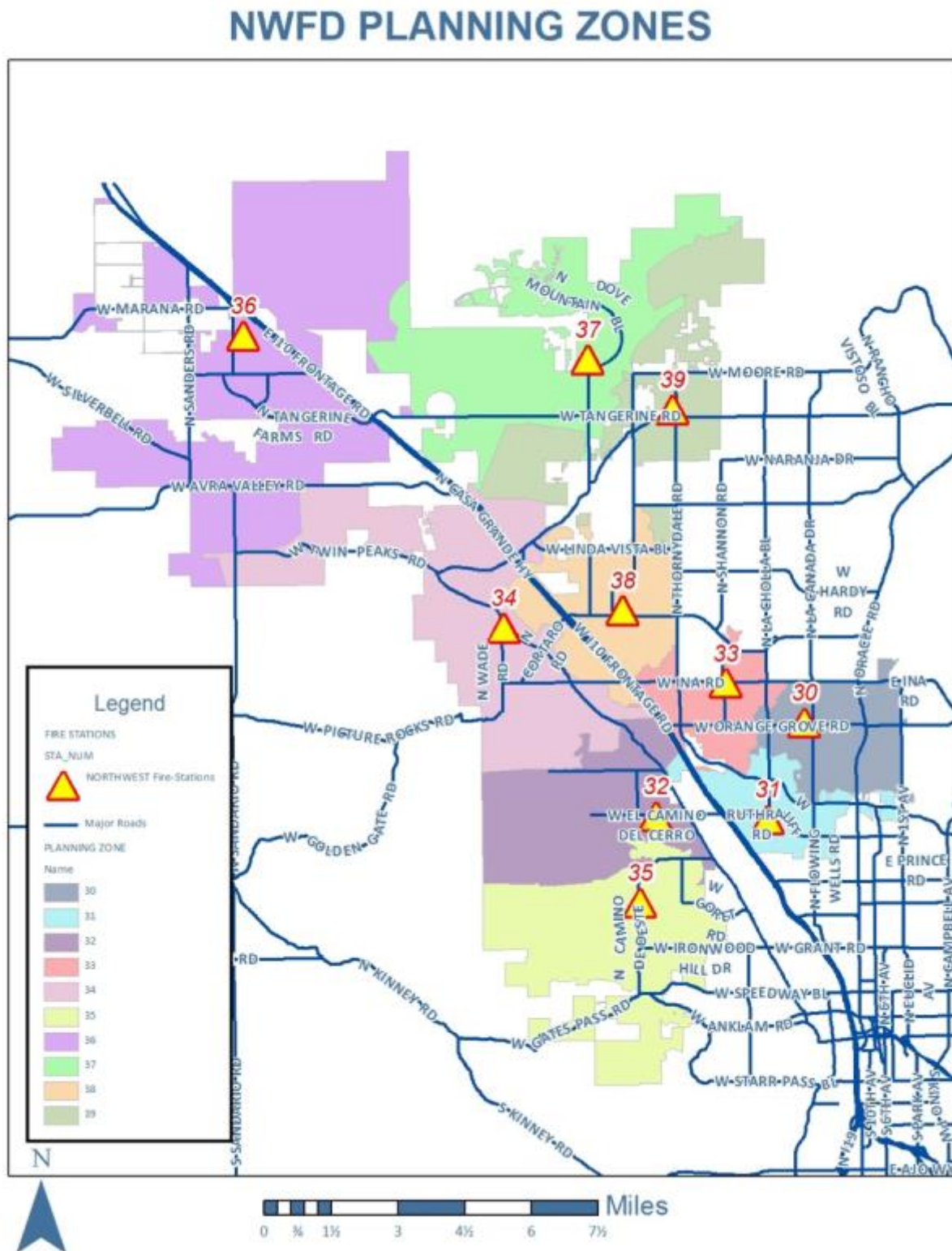
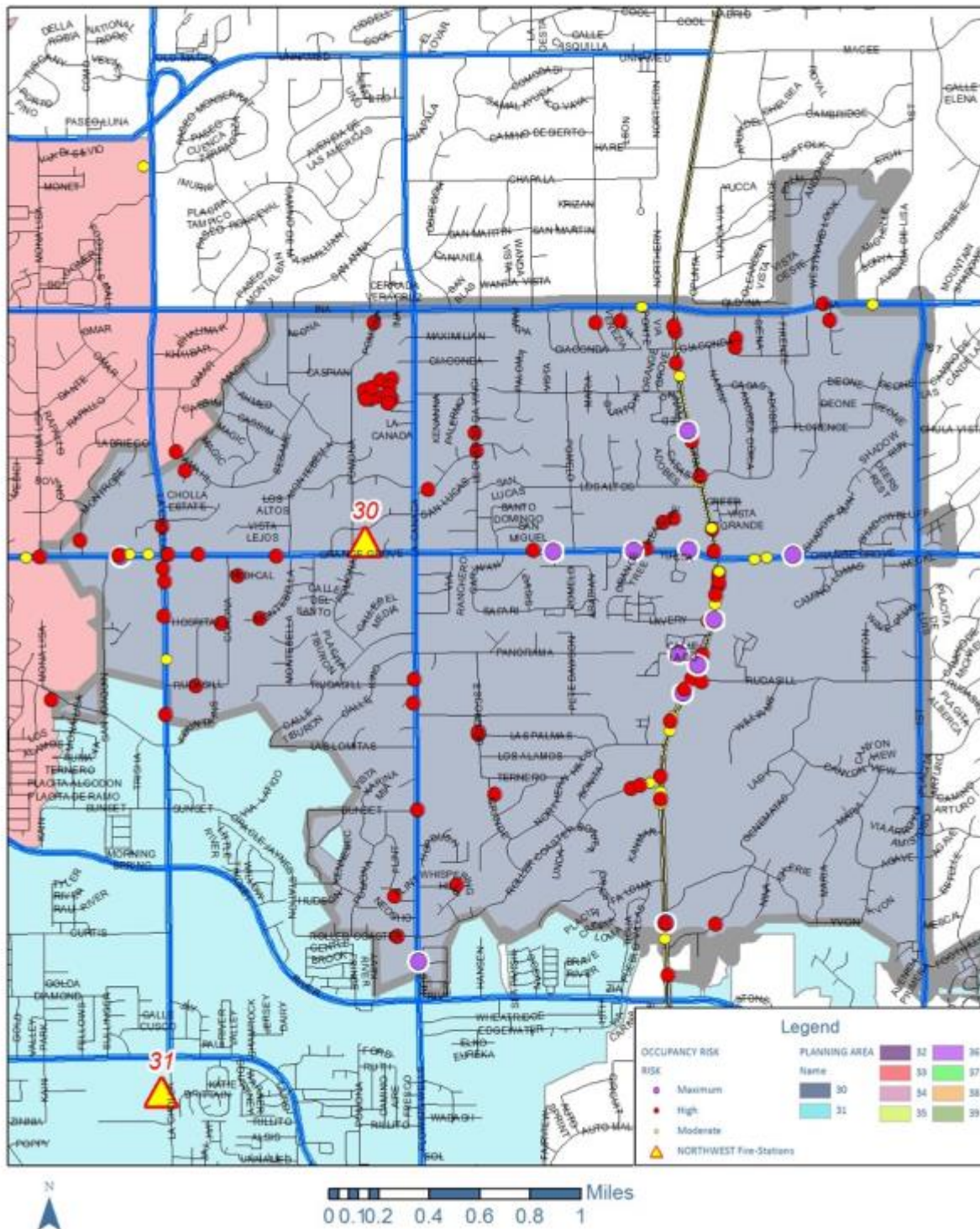








Figure 3.10

PLANNING ZONE 30



Planning Zone: 30

Battalion	South				
Description	Moderate and high density residential homes including apartment buildings. Commercial occupancies include retail and restaurants. This zone has a significant number of medical occupancies, skilled nursing facilities, and assisted care homes.				
Population Density by Area, approximate	Urban	Suburban	Rural	Undeveloped	
	25%	65%	10%	0%	
Critical Infrastructure and Significant Features	<ul style="list-style-type: none">Northwest Hospital Campus41 medium occupancy assisted care facilities6 large occupancy assisted care facilities10 non-sprinklered large garden style apartmentsWUI risk in the rolling hills from La Canada Rd. to 1st Ave.La Cima Middle SchoolDonaldson ElementaryWalker ElementaryDove of Peace Church3 Large shopping centers4 Large grocery stores4 Two to four story hotelsOracle Rd./Hwy 77				
Risk Categories	Residential Fire	EMS	HazMat	TRT	Wildland Fire
Low 					
Working Fires 2011-15, Total %	19 working fires			11% of total working fires	
2015 call volume/rank	3485 calls			1 st in total call volume	
2015 EMS total response time	6:52				
2015 Fire and Special Ops total response time	8:48				

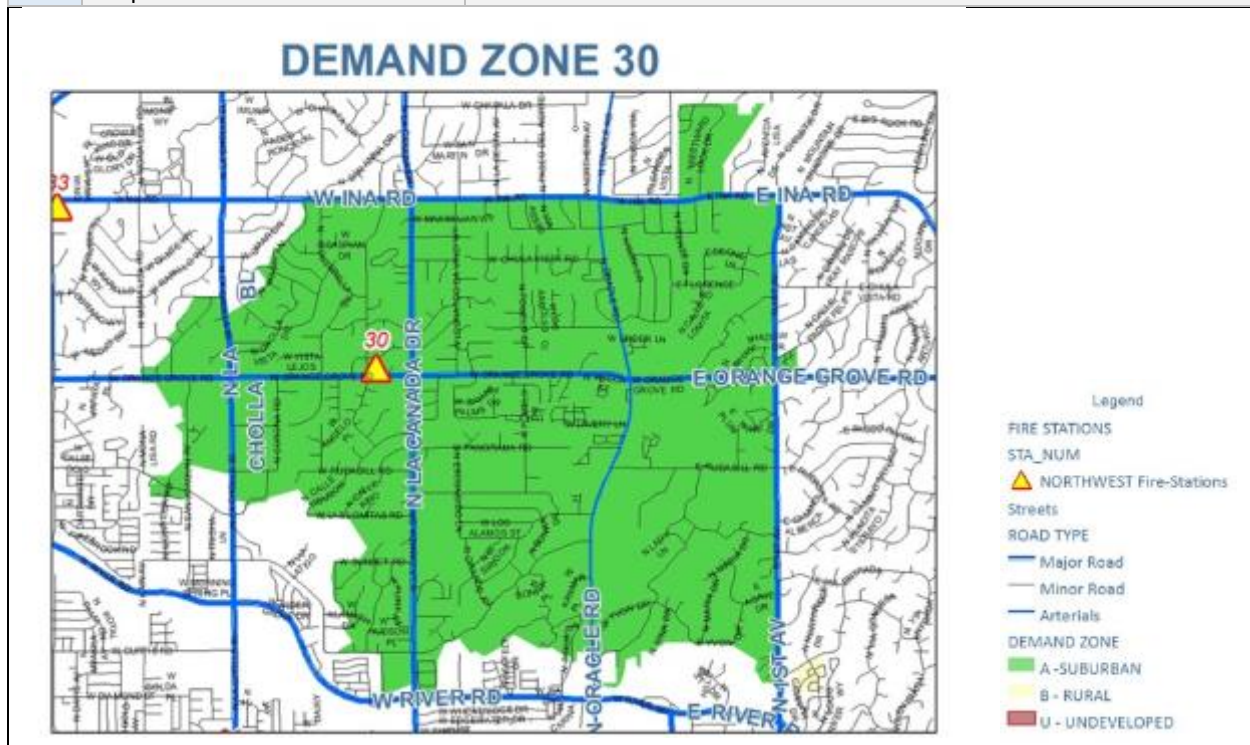
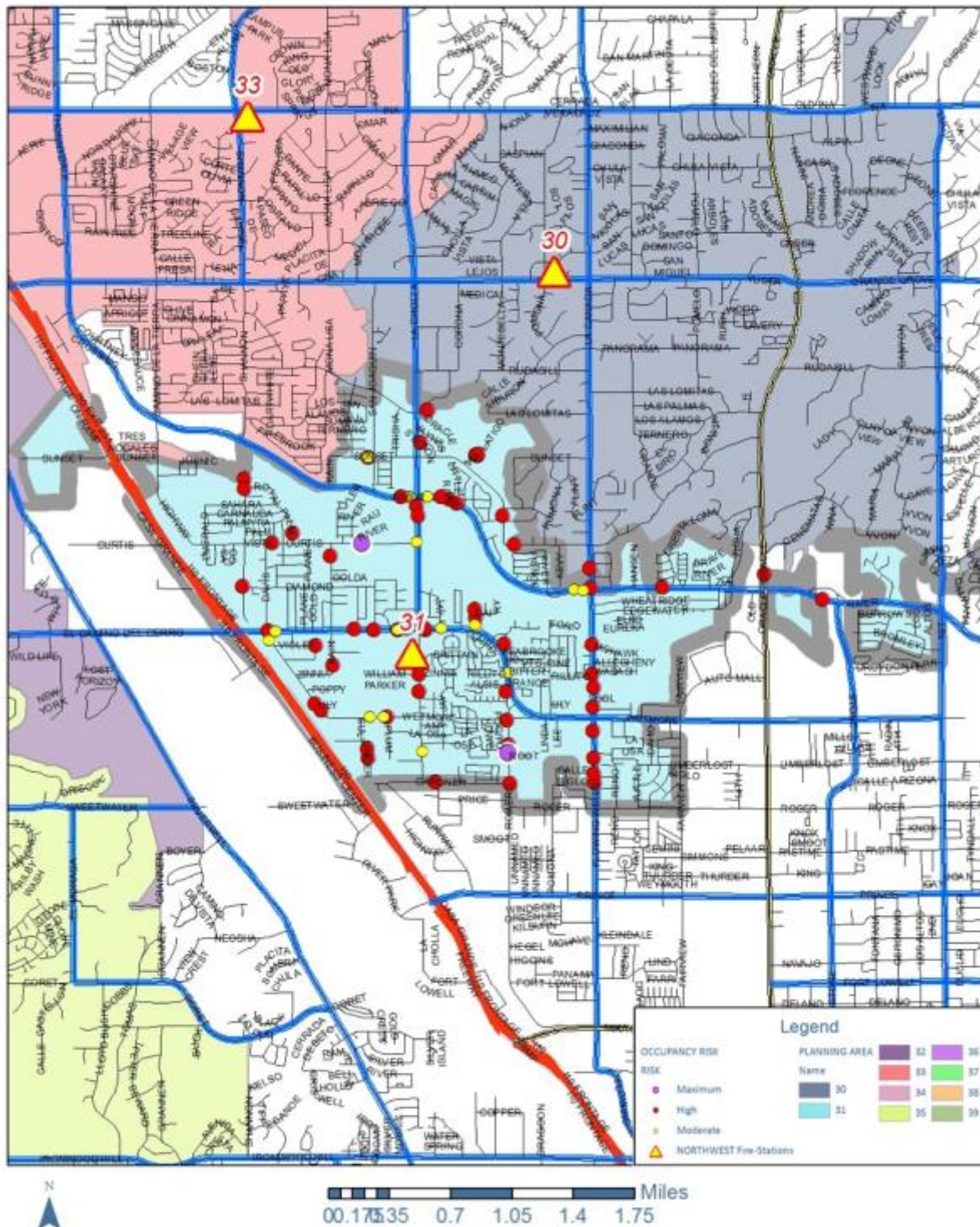





Figure 3.11

PLANNING ZONE 31



Planning Zone: 31

Battalion	South				
Description	High density SFR with a significant number of mobile homes. The commercial occupancies include industrial, retail, and restaurants.				
Population Density by Area, approximate	Urban	Suburban	Rural	Undeveloped	
	80%	20%	0	0	
Critical Infrastructure and Significant Features	<div> <ul style="list-style-type: none"> Flowing Wells Junior High School Centennial Elementary Homer Davis Elementary Laguna Elementary Sonoran Science Academy 3 large grocery stores 4 non-sprinklered self-storage facilities </div> <div> <ul style="list-style-type: none"> 11 large mobile home parks 1 large assisted care facility 1 non-sprinklered large garden-style apartment Ferrell Gas Victory Assembly Church Polyprint I-10, Natural Gas & Rail line Rillito River </div>				
Risk Categories Low Moderate High   	Residential Fire	EMS	HazMat	TRT	Wildland Fire
Working Fires 2011-15, Total %	67 working fires			41% of total working fires	
2015 call volume/rank	2615 calls			2 nd in total call volume	
2015 EMS total response time	7:48				
2015 Fire and Special Ops total response time	8:17				

DEMAND ZONE 31



PLANNING ZONE 32



Planning Zone: 32

Battalion	South				
Description	Low density single family residence				
Population Density by Area, approximate	Urban	Suburban	Rural	Undeveloped	
	0%	0%	75%	25%	
Critical Infrastructure and Significant Features	<ul style="list-style-type: none"> Tucson Mountain Park-biking and hiking trails accessed by the El Camino del Cerro Trailhead Large custom homes Santa Cruz River Accelerated Learning Laboratory Charter School El Camino Del Cerro trailhead WUI risk in the rolling desert hills of the area containing SFR and a section of the Tucson Mountain Range 				
<div>Risk Categories</div> <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div> <div> <div></div> <div></div> <div></div> </div>	Residential Fire	EMS	HazMat	TRT	Wildland Fire
Working Fires 2011-15, Total %	3 working fires		2% of total working fires		
2015 call volume/rank	293 calls		9 th in total call volume		
2015 EMS total response time	9:08				
2015 Fire and Special Ops total response time	9:40				

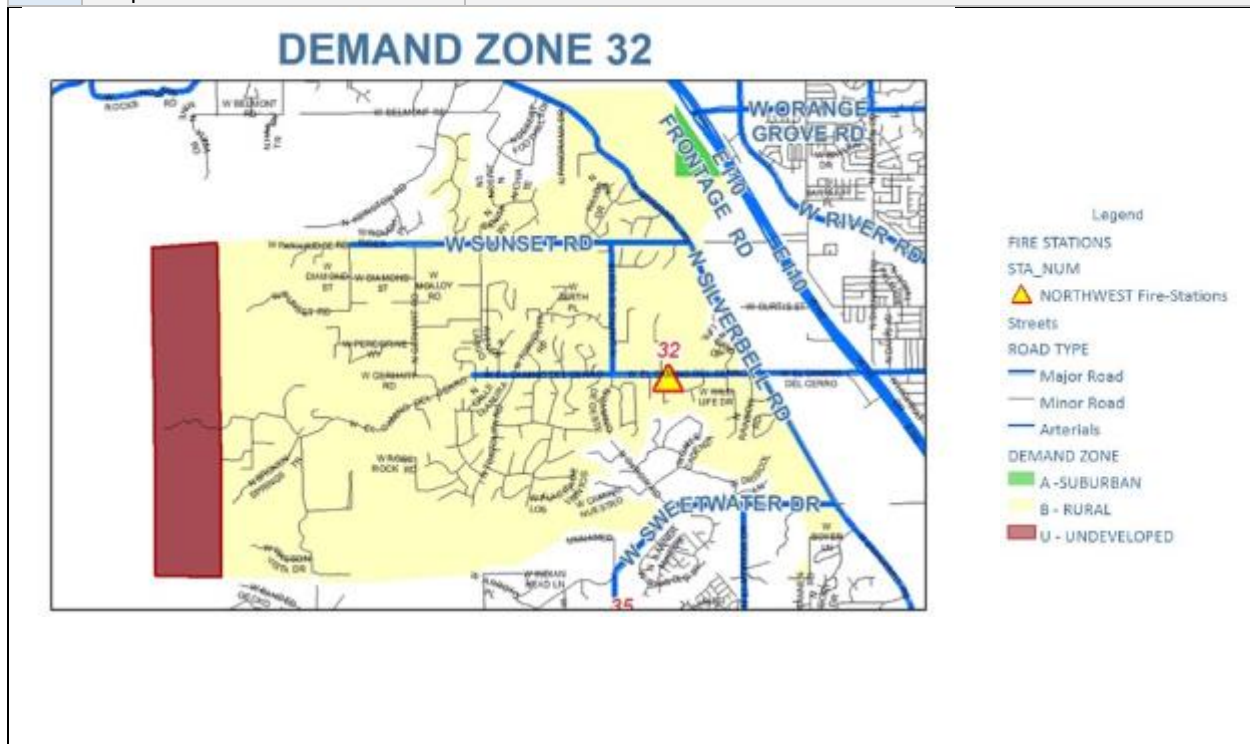
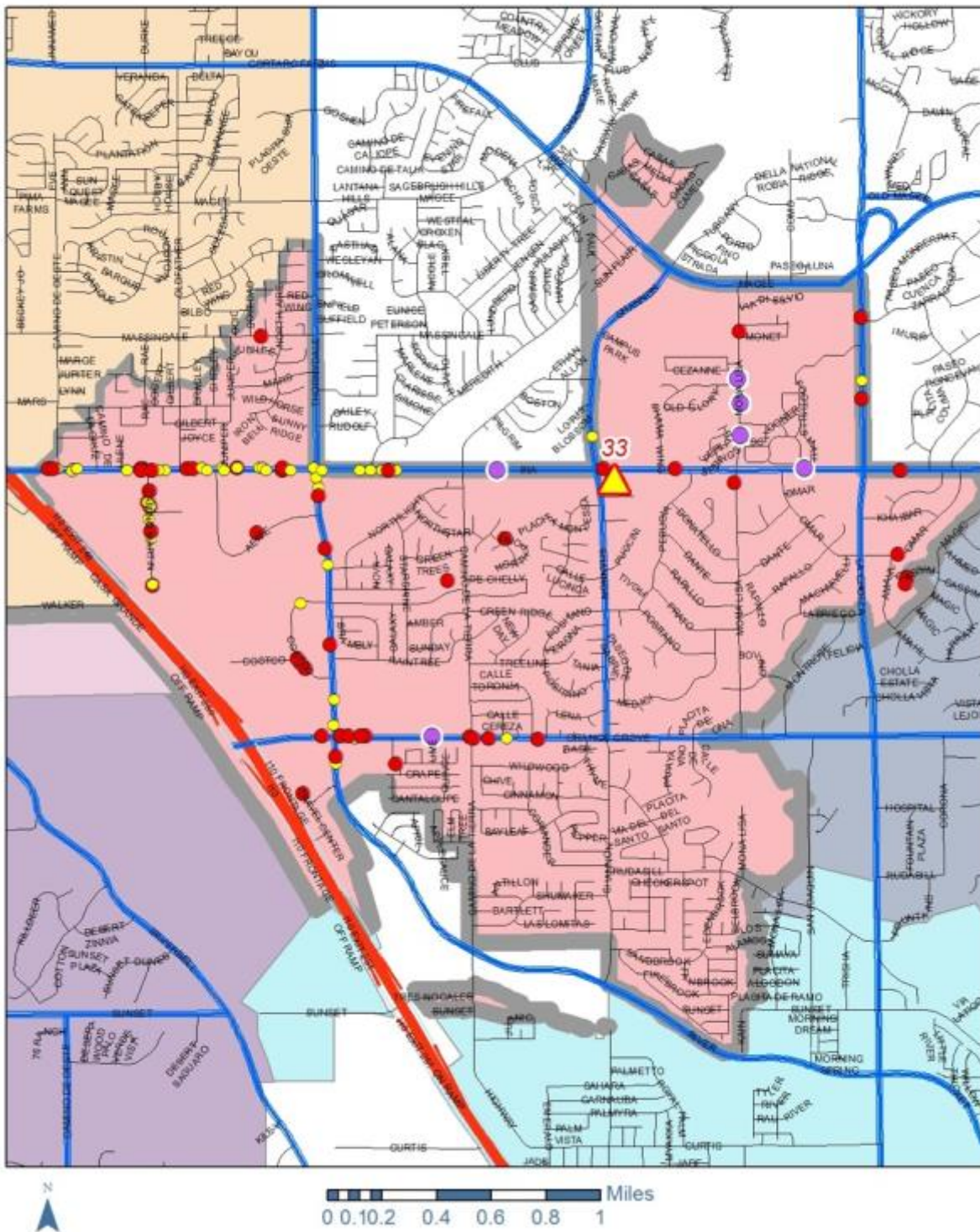


Figure 3.13

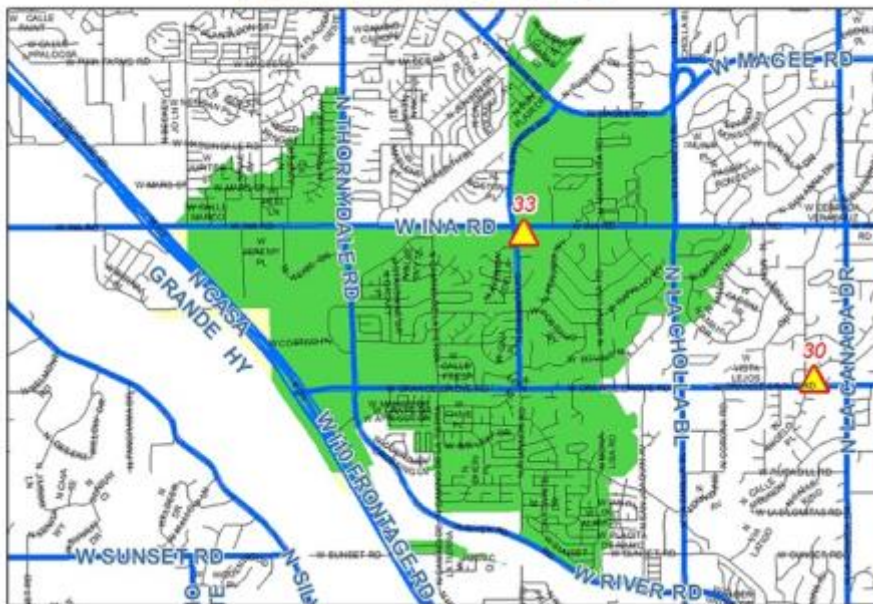
PLANNING ZONE 33



Planning Zone: 33

Battalion	South				
Description	Significant number of commercial occupancies including big box retail stores, strip malls, and restaurants. The residential areas of the zone are mixed with moderate to high density SFR and apartments.				
Population Density by Area, approximate	Urban	Suburban	Rural	Undeveloped	
	50%	50%	0	0	
Critical Infrastructure and Significant Features	<div> <ul style="list-style-type: none"> 6 non-sprinklered large garden style apartments 1 large assisted care facility 3 medium assisted care facilities 5 two to four story hotels 5 retail big box stores Several strip malls 9 non-sprinklered self-storage facilities <ul style="list-style-type: none"> Pima Community College NW Campus Richardson Elementary School Hendricks Elementary School Green Fields Country Day School I-10, Natural Gas & Rail line Canada del Oro Wash </div>				
<div> <div>Risk Categories</div> <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div> <div> <div></div> <div></div> <div></div> </div> </div>	Residential Fire	EMS	HazMat	TRT	Wildland Fire
Working Fires 2011-15, Total %	24 working fires			15% of total working fires	
2015 call volume/rank	2214 calls			3 rd in total call volume	
2015 EMS total response time	7:02				
2015 Fire and Special Ops total response time	8:49				

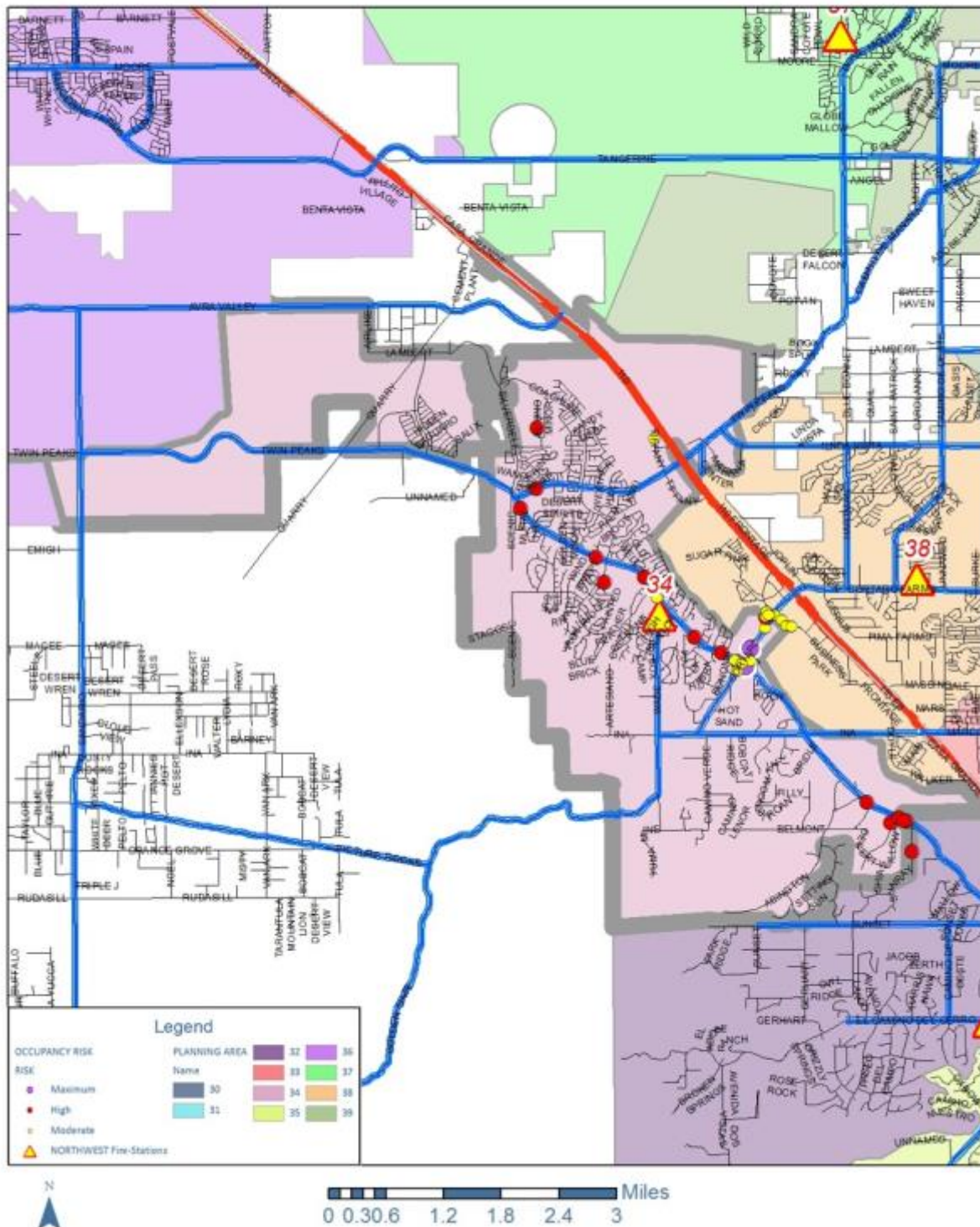
DEMAND ZONE 33



- Legend
- FIRE STATIONS
STA_NUM
▲ NORTHWEST Fire-Stations
- Streets
ROAD TYPE
— Major Road
— Minor Road
— Arterials
- DEMAND ZONE
A-SUBURBAN
B-RURAL
U-UNDEVELOPED

Figure 3.14

PLANNING ZONE 34



Planning Zone: 34

Figure 3.15

PLANNING ZONE 35

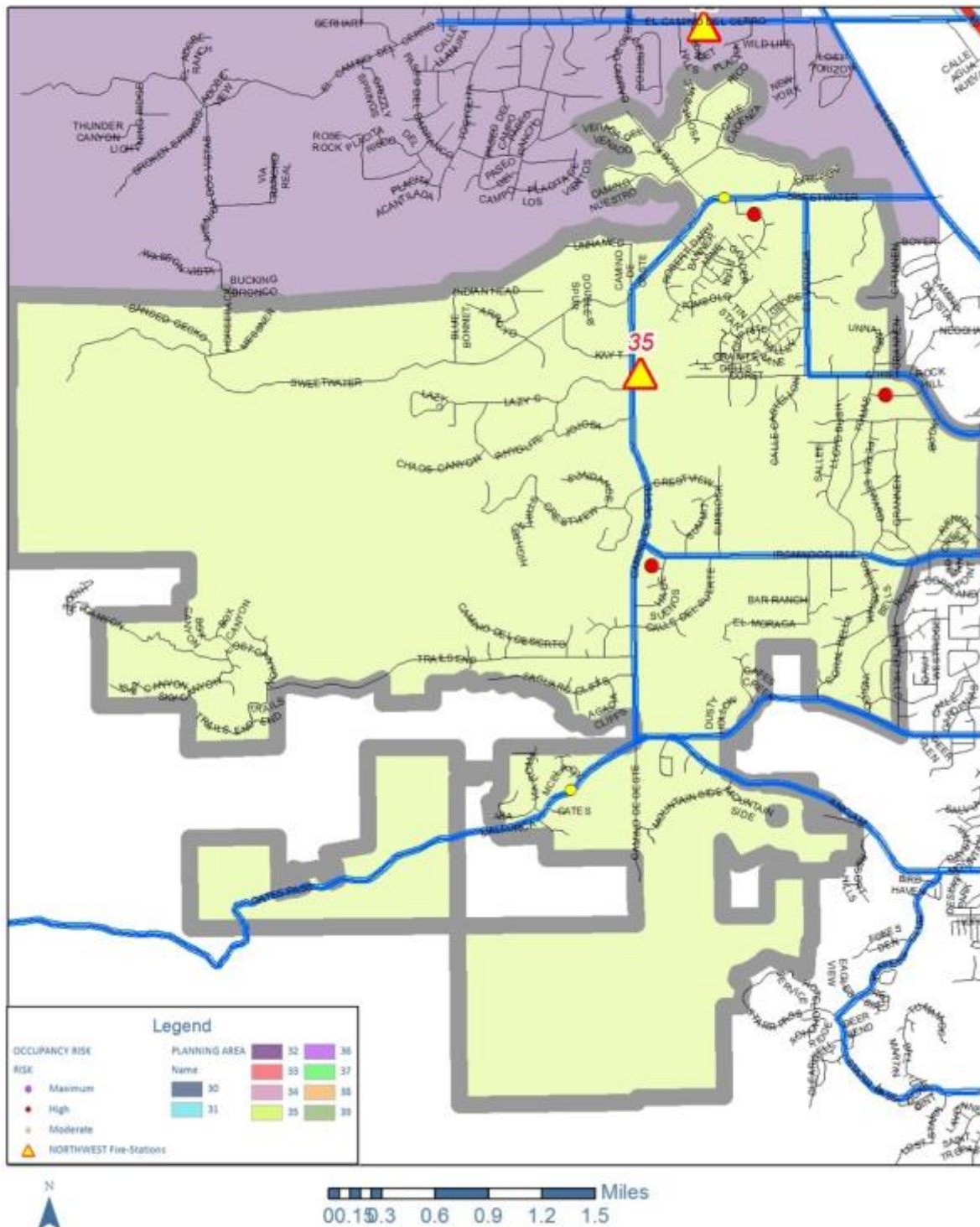
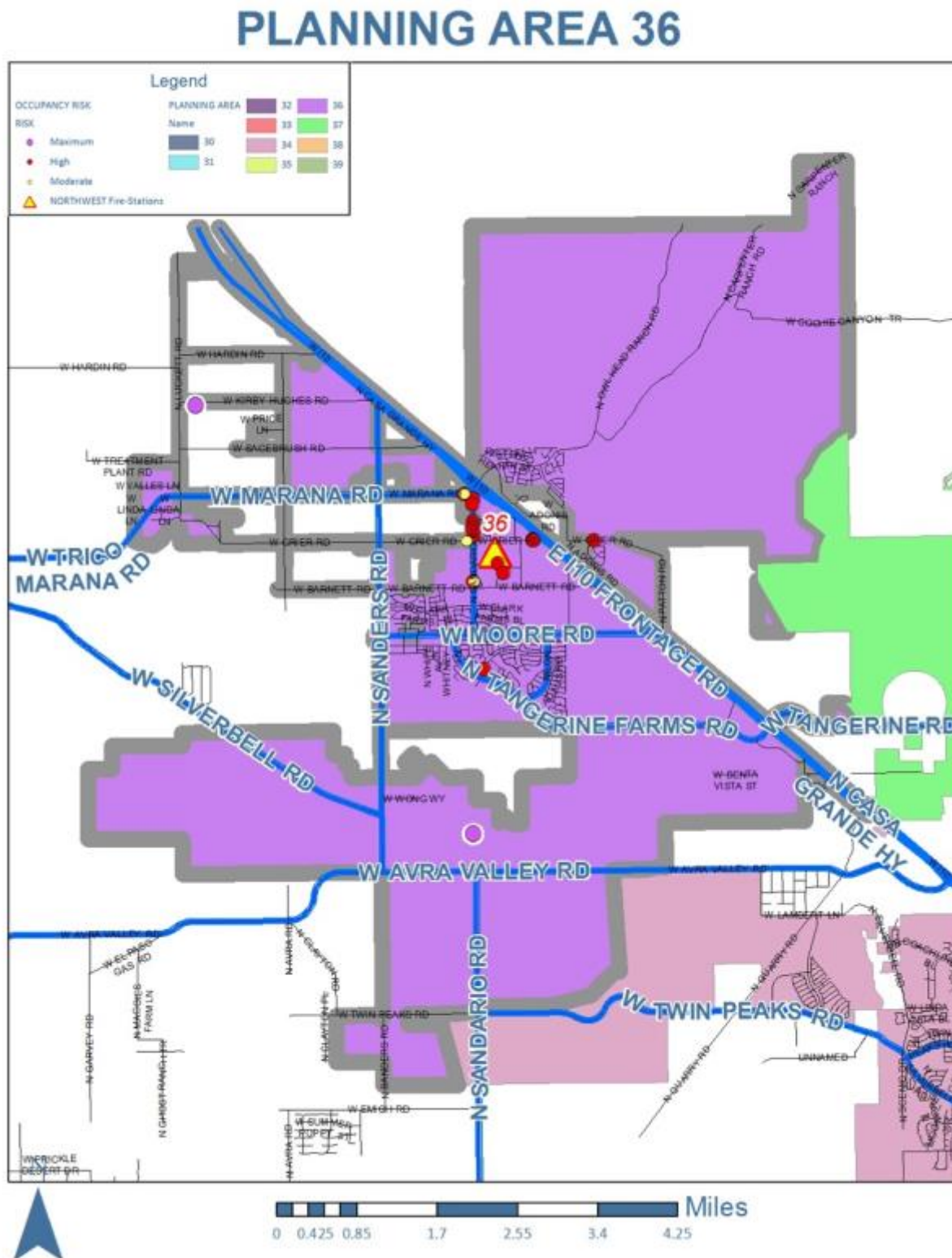
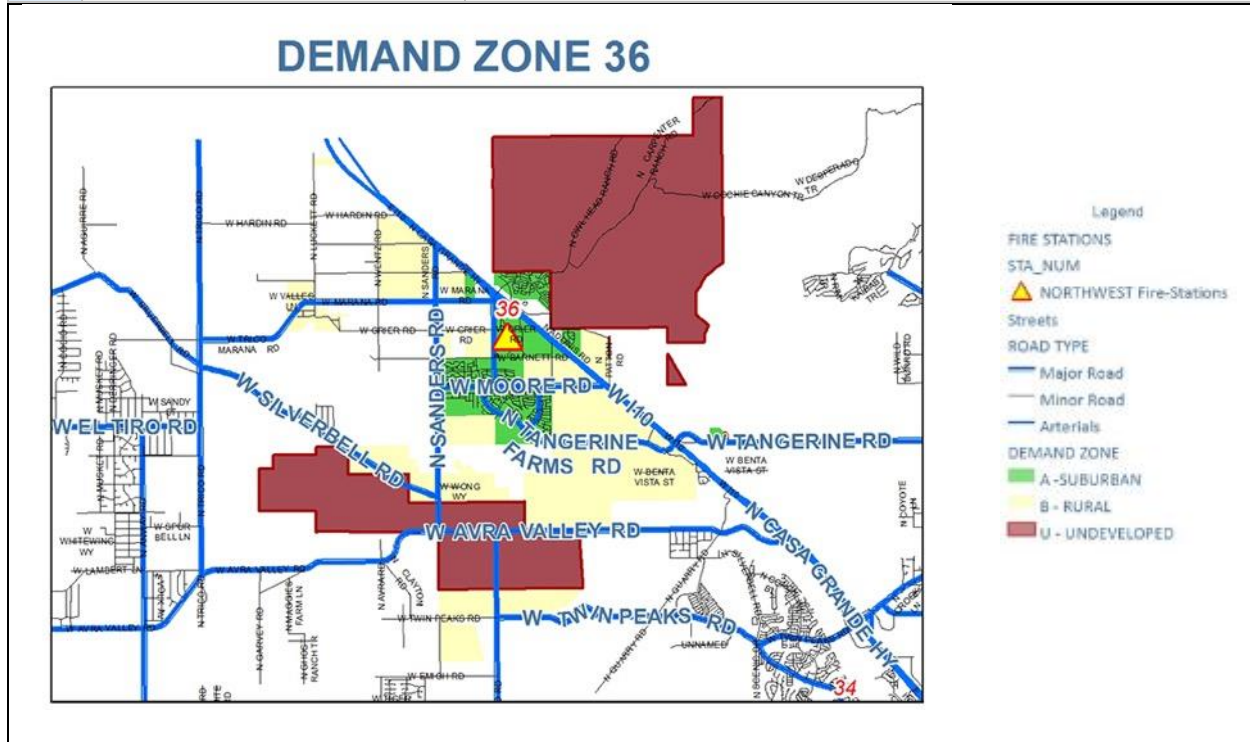


Figure 3.16



Planning Zone: 36

Battalion	North				
Description	Mix of rural to high density SFR. The area contains a significant number of agricultural fields. There are a small number of light commercial occupancies in the area with more development planned in the future.				
Population Density by Area, approximate	Urban	Suburban	Rural	Undeveloped	
	10%	15%	15%	60%	
Critical Infrastructure and Significant Features	<ul style="list-style-type: none"> Marana Regional Airport Marana Correctional Facility Former location of landfill Central Arizona Project Canal Marana Middle School Estes Elementary Marana Unified Schools Fleet and Warehouse 		<ul style="list-style-type: none"> Marana Healthcare Center Town of Marana Government Building Marana Apartments Marana Stockyards Agricultural Land with irrigation canals I-10, Natural Gas & Rail line 		
<div>Risk Categories</div> <div> <div>Low</div> <div>Moderate</div> <div>High</div> </div> <div> <div></div> <div></div> <div></div> </div>	Residential Fire	EMS	HazMat	TRT	Wildland Fire
Working Fires 2011-15, Total %	12 working fires			7% of total working fires	
2015 call volume/rank	850 calls			6 th in total call volume	
2015 EMS total response time	9:48				
2015 Fire and Special Ops total response time	10:05				



PLANNING ZONE 37



Planning Zone: 37

Battalion

Description

Population Density by Area, approximate

Critical Infrastructure and Significant Features

Risk Categories

Low

Moderate

High

Working Fires 2011-15, Total %

2015 call volume/rank

2015 EMS total response time

2015 Fire and Special Ops total response time

North

Moderate to high density SFR. The area contains a large retirement community, club house, and golf courses.

Urban

Suburban

Rural

Undeveloped

• Canyon Pass Community

• Heritage Highlands Retirement Community

• WUI risk in desert areas surrounding the SFR subdivisions and Tortolita Mountain Range

• Ritz Carlton Hotel and Resort

• Tortolita Mountain Range

• Wild Burro Trailhead

• Empty Big Box Store

• Breaker’s Water Park

• Trico Electric

Residential Fire

EMS

HazMat

TRT

Wildland Fire

7 working fires

4% total working fires

508 calls

7th in total call volume

10:19

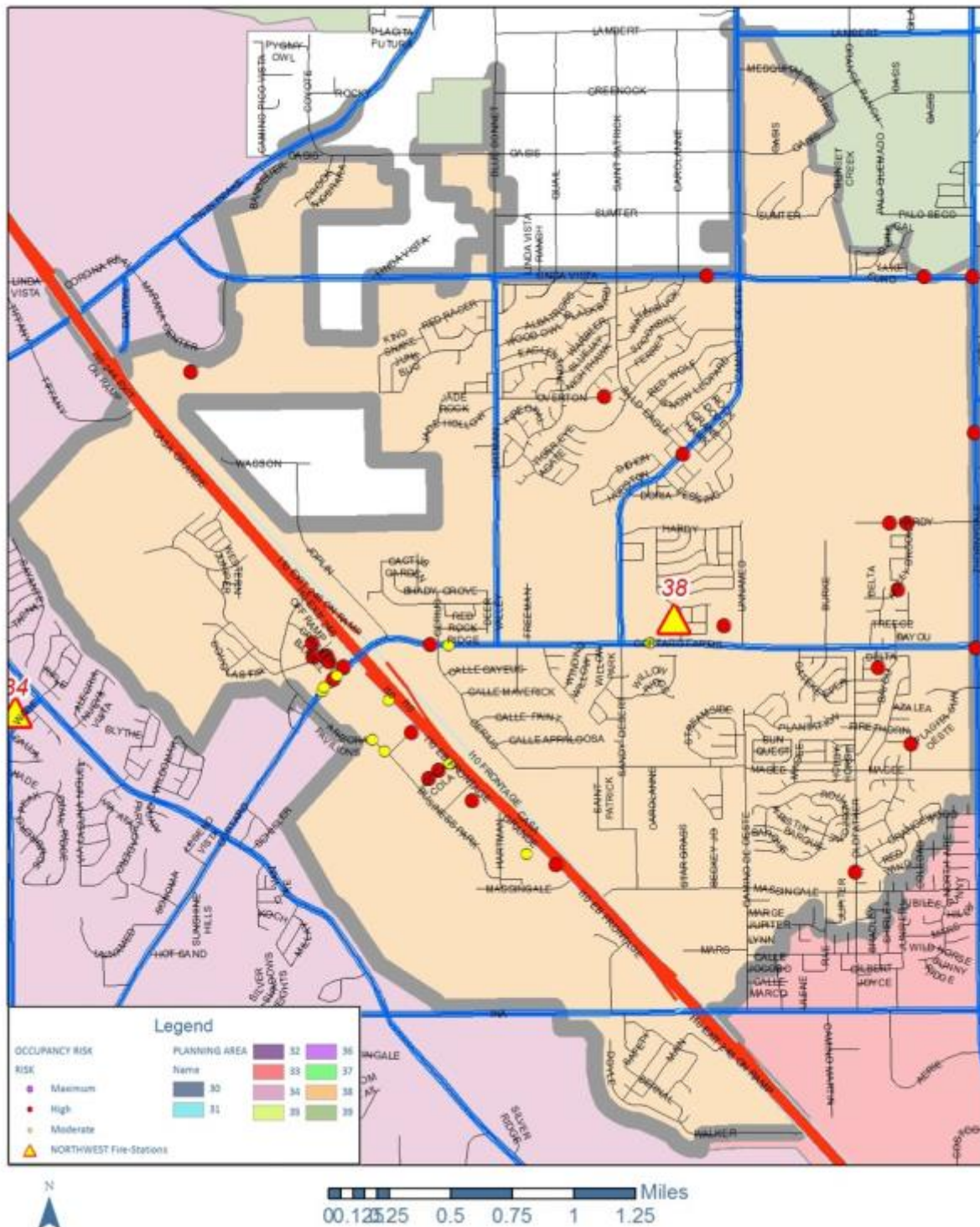
10:57

DEMAND ZONE 37






Figure 3.18

PLANNING ZONE 38



Planning Zone: 38

Battalion	North				
Description	Low to high density SFR with some apartment and several schools. Light commercial, retail, and restaurants.				
Population Density by Area, approximate	Urban	Suburban	Rural	Undeveloped	
	25%	30%	30%	15%	
Critical Infrastructure and Significant Features	<ul style="list-style-type: none">Ina Road Waste Water Treatment FacilityWaste Management transfer facilitySargent ControlsI-10, Natural Gas & Rail lineTortolita Middle SchoolMountain View High SchoolQuail Run ElementaryThornycroft Elementary				
Risk Categories	Residential Fire	EMS	HazMat	TRT	Wildland Fire
Low 	Moderate 	High 			
Working Fires 2011-15, Total %	14		8% of total working fires		
2015 call volume/rank	1600 calls		5 th in total call volume		
2015 EMS total response time	8:18				
2015 Fire and Special Ops total response time	10:50				

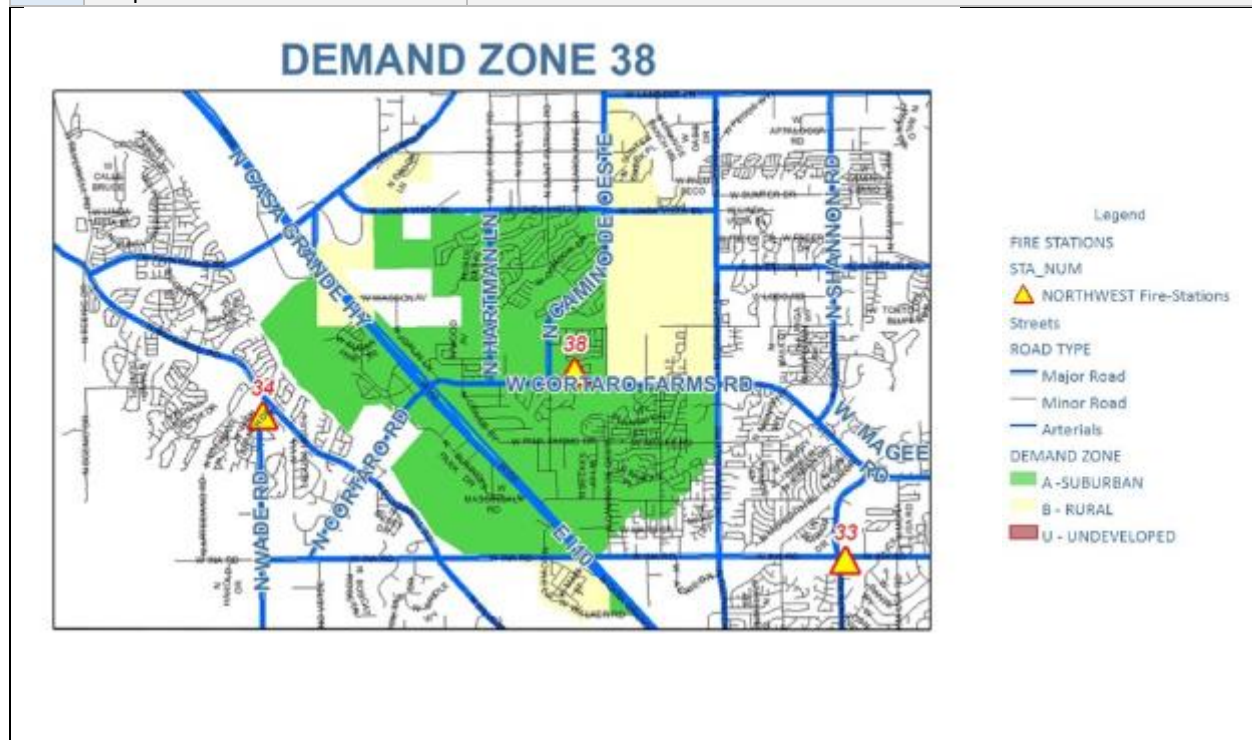
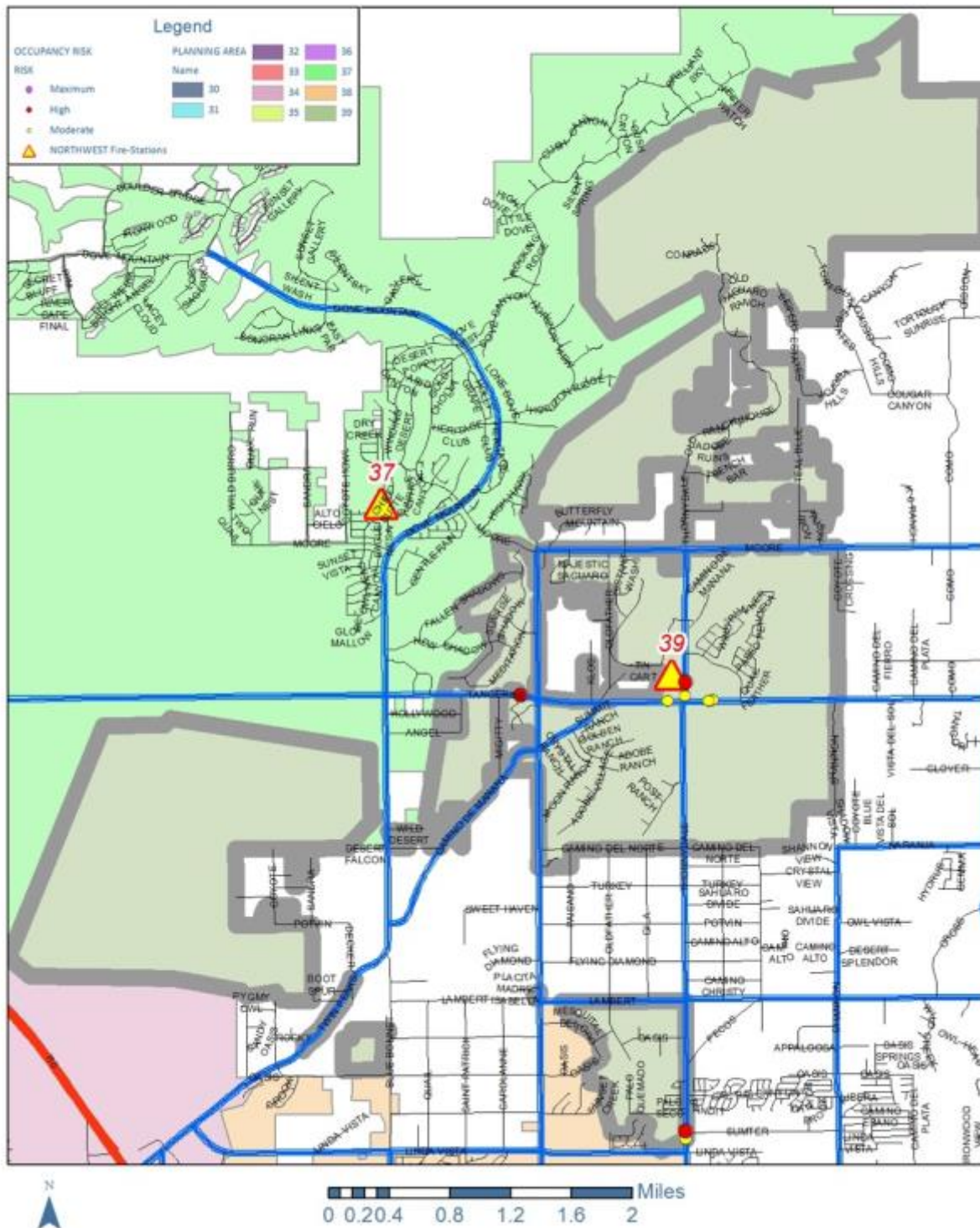


Figure 3.19

PLANNING ZONE 39



Planning Zone: 39

Battalion

Description

Population Density by Area, approximate

Critical Infrastructure and Significant Features

Risk Categories

Low

Moderate

High

Working Fires 2011-15, Total %

2015 call volume/rank

2015 EMS total response time

2015 Fire and Special Ops total response time

North

Low to high density SFR. Light commercial/retail occupancies with a strip mall and grocery store.

Urban

Suburban

Rural

Undeveloped

0%

20%

20%

60%

- Fry's Shopping Center
- Saguaro Ranch Community
- WUI risk in the large desert areas surrounding SFR subdivisions and in the Tortolita Mountain Range
- Tangerine Rd.

Residential Fire

EMS

HazMat

TRT

Wildland Fire

5 working fires

3% of total working fires

273 calls

10th in total call volume

8:02

11:24

DEMAND ZONE 39



- Legend
- FIRE STATIONS
STA_NUM
▲ NORTHWEST Fire-Stations
- Streets
ROAD TYPE
— Major Road
— Minor Road
— Arterials
- DEMAND ZONE
A - SUBURBAN
B - RURAL
U - UNDEVELOPED



Large Scale Event Risk Assessment

As part of the community risk assessment, NWFD sought to identify large scale, low frequency/severe consequence risk. A multi-dimensional profile risk index (PRI) was utilized by the senior chief officer staff that resulted in the identification and ranking of nine large scale risks. The PRI process consisted of rating five elements with an associated weighted value¹⁴.

The five elements and their associated weighted values are:

- Probability (30%)
- Vulnerability (30%)
- Spatial Extent (20%)
- Speed of Onset or Warning Notice (10%)
- Duration (10%)

The completed PRI scoring matrix can be located in Appendix 3.B. Discussion of each large risk identified and the associated risk category rating and PRI score follows, listed in rank order per the associated PRI score.

1. Large-scale Hazardous Material Incident



PRI Score = 4.1, High Risk Category - This risk, also known as a “Level 3” hazmat incident, is an incident involving hazardous materials that is beyond the capabilities of the NWFD hazmat response team and requires additional regional assistance. Level 3 incidents can require resources from state and federal agencies and private industry. These incidents generally pose extreme, immediate, and/or long-term risk to the environment and public health. NWFD has significant exposure to a Level 3 hazmat event due to large quantities of hazardous materials that are transported daily through the District on Interstate 10, Union Pacific Railroad and the large petroleum pipelines that run adjacent to the interstate.

2. Extended Power Failure



PRI Score = 3.7, Moderate Risk Category - This risk likely would come in the form of a large scale grid failure. NWFD experiences small to medium scale power failures several times a year, primarily due to area provider equipment failure or damage caused by summer thunderstorms. These generally do not result in widespread and extended (more than a few hours) power outages. A large-scale power grid failure could result in no power for several days. With the on-going aging of the power grid infrastructure combined with the growing threat of an intentional physical or cyber-attack on the energy infrastructure along with the associated consequences, this risk was moderate.

¹⁴ Beyond the Basics, Best Practices in Local Mitigation Planning, www.mitigationguide.org, and National Fire Academy On-campus Executive Fire Officer Community Risk Reduction course curriculum.



3. Weapons of Mass Destruction (WMD) Event

M PRI Score = 3.4, Moderate Risk Category - This risk can be the result of an intentional biological, chemical, or radiological event. NWFD has significant critical infrastructure and occupancies that can be considered hard and soft targets for this type of event. Combined with an instantaneous speed of onset and a recent increase in the trend of individual and organized terrorism events within the U.S. and abroad, the WMD PRI assessment resulted in a classification of moderate.

4. Mass Casualty Incident (MCI)

M PRI Score = 3.2, Moderate Risk Category - NWFD generally classifies an MCI as 10 or more “immediate” or “delayed” patients. Incident history, potential for such an event due to the freeway and other causes of MCI’s, and the lack of “detecting” these events ahead of time resulted in a moderate risk category rating.

5. Santa Cruz River Flood Event

M PRI Score = 3.2, Moderate Risk Category - The Santa Cruz River runs through approximately 18 miles of the Northwest Fire District. Approximately half of the adjacent land has significant development or infrastructure adjacent to, or within the 100-year floodplain. While much of the river is lined with soil cement bank protection in developed areas, in the event of a failure of this flood control measure hundreds of homes would be at risk of flooding. In addition, there are only four bridges over the river in the District. Should any or all the bridges be compromised in a flood event, it would create serious response capability issues. There have been two significant flood events along the Santa Cruz within the District boundaries in the past 30+ years, occurring in 1983 and 1993.

The existing Ina Road Bridge will be replaced in 2017 with a new, more flood resistant bridge. In addition, as previously mentioned a new Sunset Road Bridge scheduled for completion in early 2017 will improve access across the river. These improvements, combined with a perceived reduction in the likelihood of a large flood event due to the expected continued long-term drought, helped limit this risk category to moderate.

6. Cyber-attack on NWFD IT System

M PRI Score = 3.1, Moderate Risk Category - Newly recognized as a large-scale risk for the District, a cyber-attack on the IT system would have an extremely serious effect on the District’s ability to maintain effective internal and external service delivery for daily operations. Several fire departments and districts in the U.S. recently have experienced targeted attacks on their IT systems and the trend appears to be increasing. Because the District has an extremely high reliance on functional IT systems and due to the upward trend of these types of attacks, this risk was categorized as moderate.



7. Severe Thunderstorm/Microburst



PRI Score = 3.1, Moderate Risk Category - A microburst is a localized column of sinking air (downdraft) within a thunderstorm and is usually less than two miles in diameter. Microbursts can cause extensive damage at the surface, and in some instances, can be life threatening. They can generate winds in excess of 60 mph and can result in very heavy, relatively short durations of rainfall sometimes occurring in the form of hail. The resulting aftermath of a microburst can include localized flooding, severe wind damage to buildings and power lines that can result in associated injuries to the public and cause extensive access issues within the area affected.

8. Pandemic



PRI Score = 2.9, Low Risk Category - In recent years, the United States has experienced an increased risk of potential pandemics; most notably the H1N1 and Ebola viruses recently caused great concern regarding the possibility of a pandemic in the U.S. The residents of NWFD would be at risk for a pandemic just as other U.S. residents. The likelihood of a pandemic continues to increase primarily due to three factors:

- The U.S. and world population continues to grow.
- Trends in urbanization continue to grow (concentration of population).
- The population is travelling more frequently, faster, and farther.

While the effect of a pandemic on NWFD would have farther-reaching implications than many of the other large-scale risks identified, the probability of this event combined with the relatively slow speed of onset (detection) helped to classify this risk as low.

9. Wildland-Urban Interface (WUI) Fire



PRI Score = 2.7, Low Risk Category - The areas of wildland-urban interface fire risk in NWFD have been identified as part of the community risk assessment, as found in Figure 3.23 on page 71 of this document. These areas primarily consist of the foothills areas of the Tucson and Tortolita Mountains, as well as a small area on the eastern edge of the District.

The threat of a WUI event is directly linked to the light fuel vegetation growth, which in turn is tied to rainfall. Without a significant presence of these light fuels (annuals), it is difficult for a fire to carry over a significant distance. While there has not been a significant WUI event in NWFD, the possibility does exist.



Risk Assessment for NWFD Service Level Classifications

NWFD has completed risk assessments for the various service levels provided including:

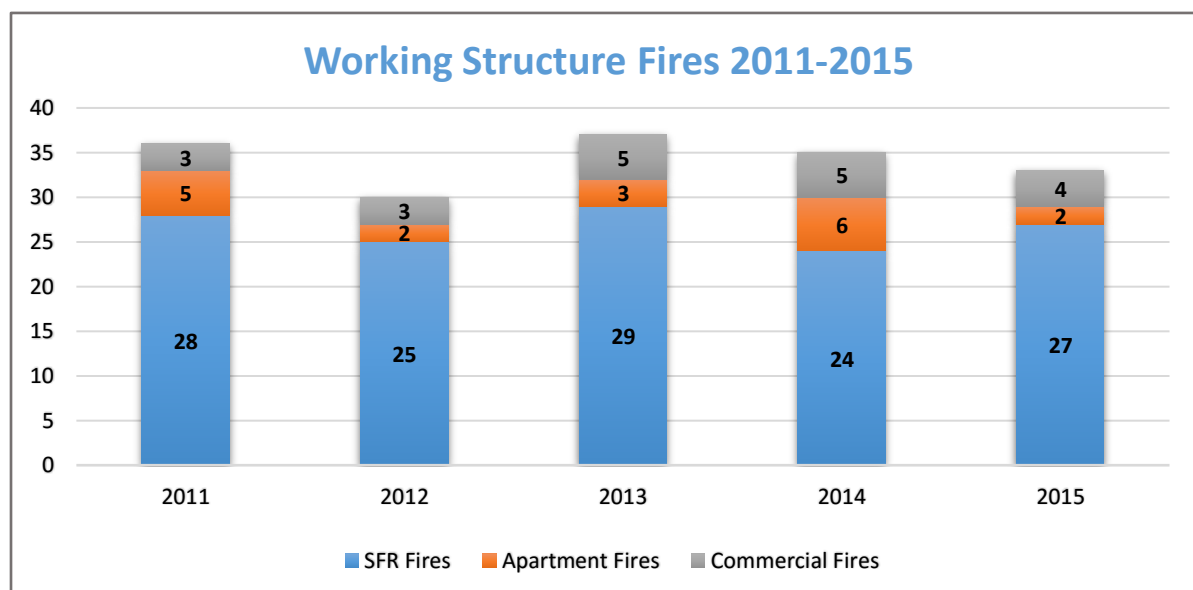
- Fire
- EMS
- TRT
- Hazmat
- Wildland
- Aviation Rescue and Firefighting

As a result of the identification, assessment, and categorization of risks for these service levels, NWFD has performed critical task analyses for each identified level of risk and developed associated effective response forces to accomplish the desired performance objectives as listed in Section 5, Evaluation of Current Deployment and Performance. Critical tasks are defined as the activities that must be accomplished in a timely manner by firefighters at emergency incidents in order to stabilize and control the situation with life safety as the priority tactical objective. Effective response force is the minimum amount of staffing, apparatus, and equipment that must be present at a particular incident within a maximum prescribed total response time to accomplish the identified critical tasks.

Fire Risk Assessment

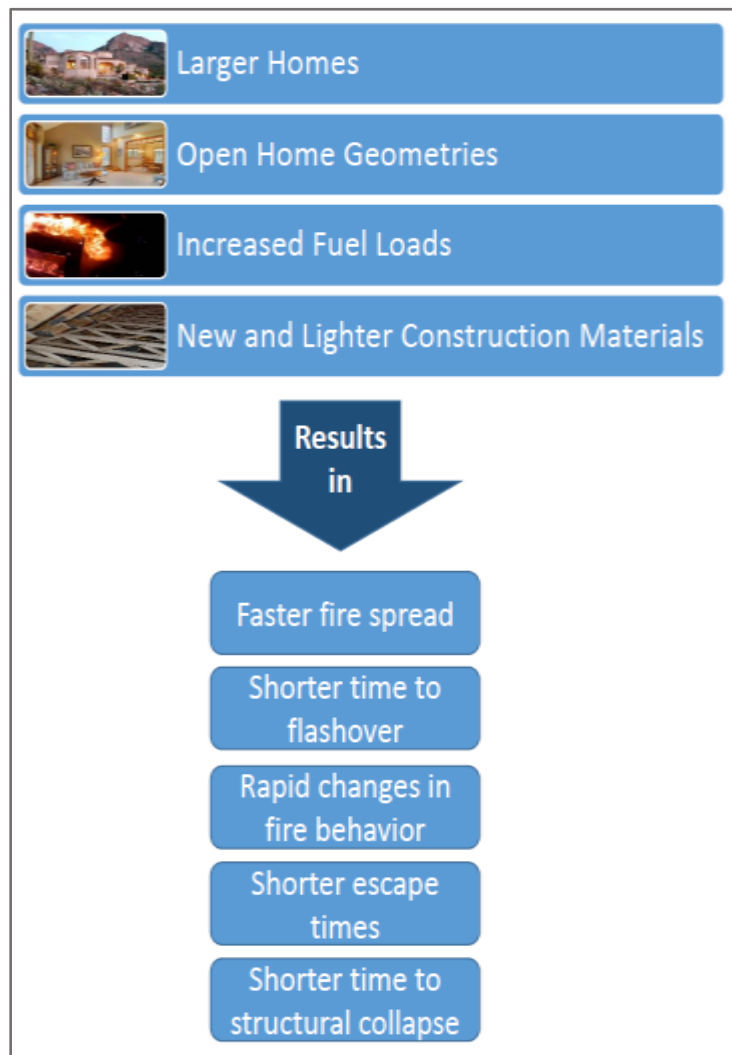
As with any risk assessment, it is important to review the history of the related risk. Figure 3.21 on page 68 shows the locations of all working fires during the period of 2011-2015. Below, Figure 3.20 shows the number of working fires in single-family residences (SFR's), apartments, and commercial occupancies during the period of 2011-2015.

Figure 3.20



During the period of 2011-2015, 78% of the working structure fires were single family residential, 12% commercial and 11% apartment occupancies. This clearly indicates that in terms of frequency alone, residential fires are a substantial fire risk in NWFD. Compounding the risk is the fact that most residential construction in the District is relatively new, constructed in the past 30 years (often described in building construction as the “lightweight era”). Underwriter Laboratories has authored a report¹⁵ that addresses the changes in residential building construction materials and practices and how those changes in fire load quantity and material have contributed to a significant increase in risk to the public and firefighters at residential structure fires that are not sprinklered. The following graphic, based on the UL report’s “Modern Fire Formula”, illustrates this increased risk to both the public and firefighters. Therefore, while the frequency of structure fires is generally down in the U.S. and in NWFD, the factors contributing to a more severe outcome have increased.

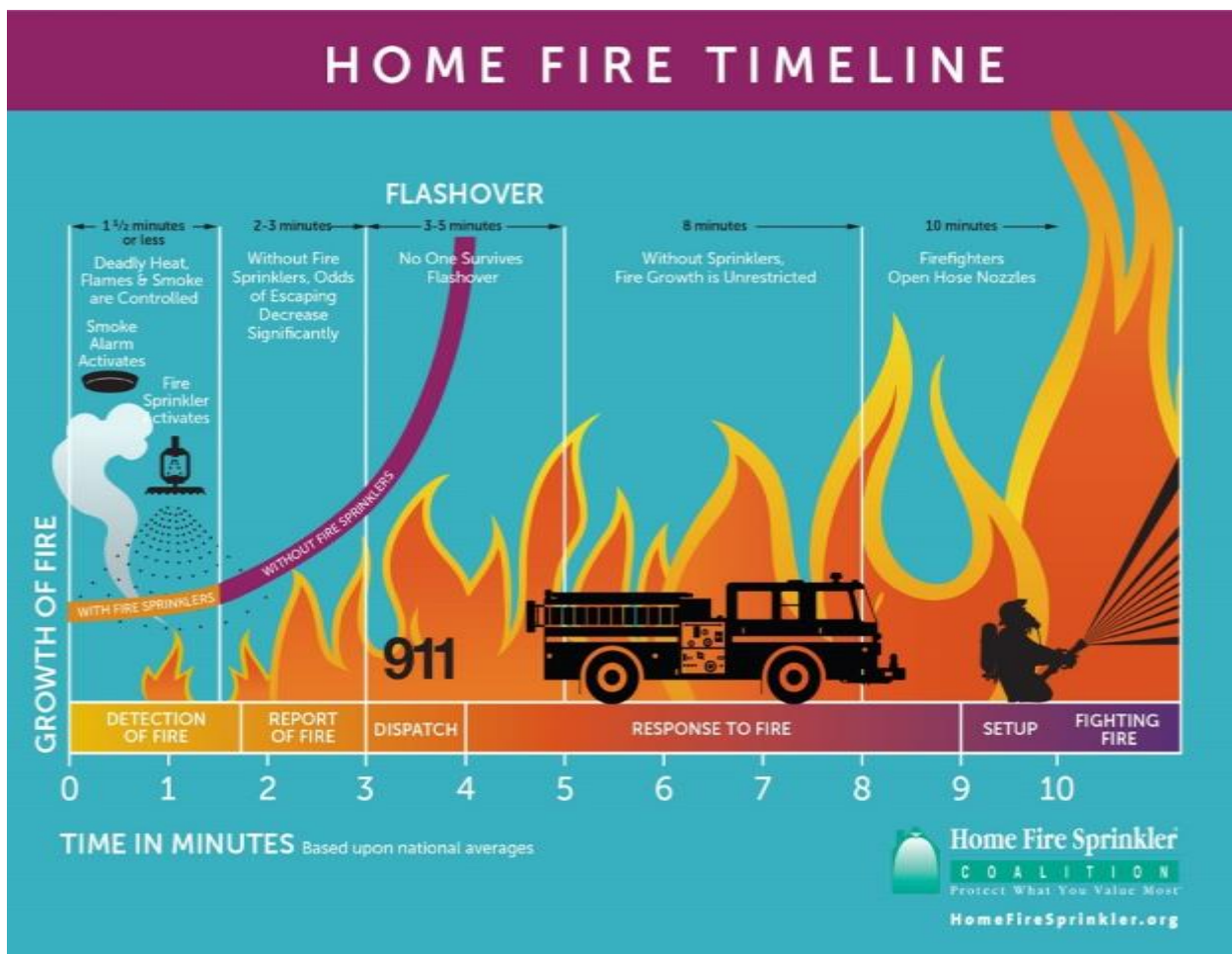
UL Modern Fire Formula



¹⁵ Analysis of Changing Residential Fire Dynamics and Its Implications on Firefighter Operational Timeframes. Underwriter Laboratories, <http://newscience.ul.com>

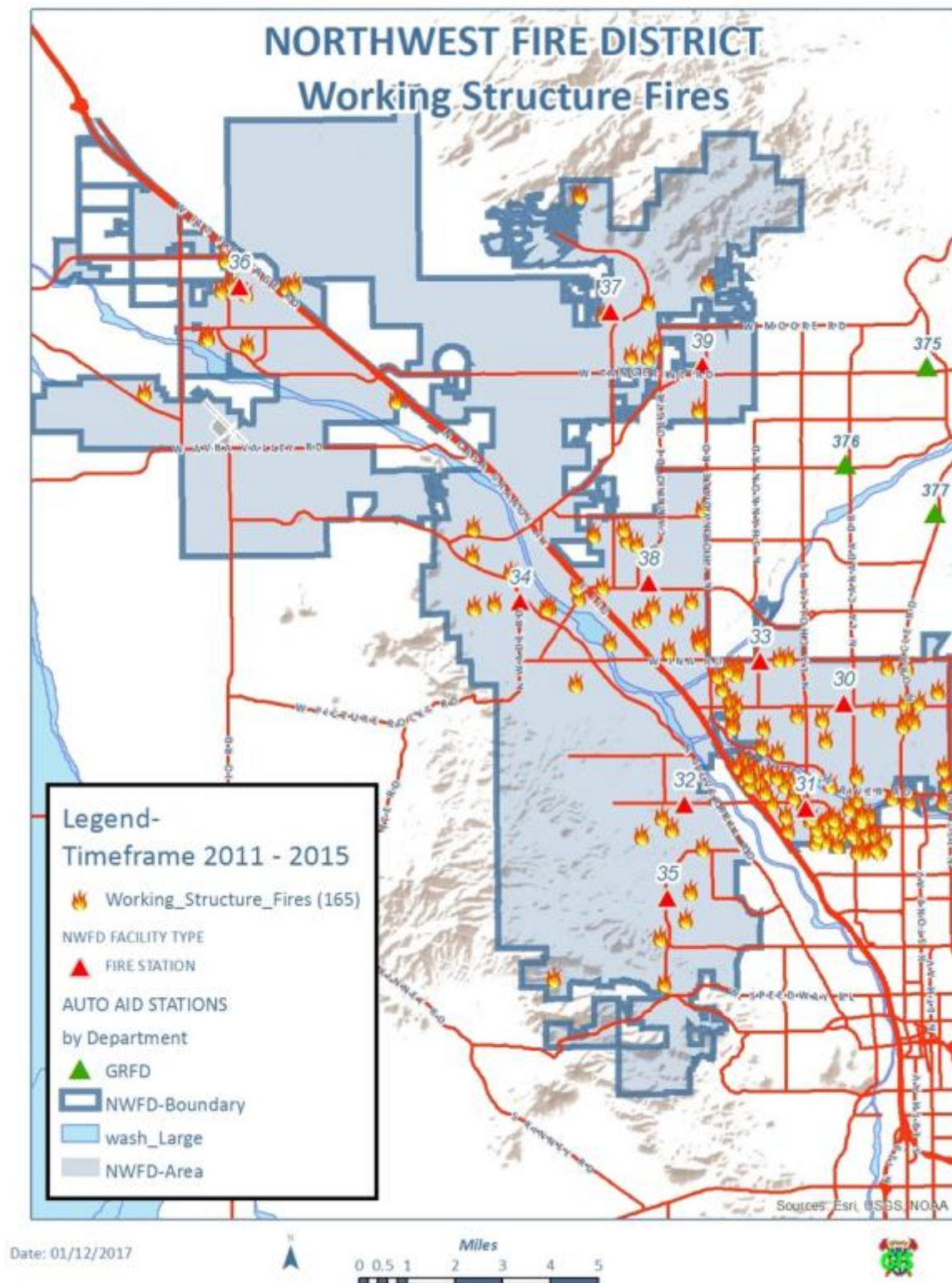
Flashover is described as occurring when all surfaces and contents of a space reach their ignition temperature nearly simultaneously resulting in full room fire involvement. It generally represents a condition that is not survivable by occupants or firefighters. It is typically identified as a priority to prevent during fire suppression efforts due to its life threatening potential. As noted in the UL-based illustration, the time to flashover conditions has drastically reduced in the modern construction era, often only five to seven minutes. While the instances of structure fires have decreased to some degree over the District's 26-year history, the decreased amount of time to flashover has further increased the risk to the public and firefighters at newer residential and commercial structures. The following chart illustrates the progression of fire to the point of flashover and the importance of timely intervention to prevent flashover.

The figure also illustrates the value of fire sprinklers to prevent a fire from advancing to the point of flashover. The death rate from fires at residences with fire sprinklers is *six times less* than those without such fire protection systems.



Source: Home Fire Sprinkler Coalition, <http://homefiresprinkler.org>

Figure 3.21





Being able to contain a fire to the room of origin is central to not only limiting property loss, but to reducing civilian deaths. The NFPA's Fire Analysis and Research Division in its 2015 Home Structure Fire report¹⁶ validates this as illustrated in Figure 3.22.

Figure 3.22

Extent of Fire Spread	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined Fire Identified by Incident Type	168.700	(47%)	0	(0%)	1.710	(13%)	\$39	(1%)
Confined to Object of Origin	31.400	(9%)	80	(3%)	800	(6%)	\$249	(4%)
Confined to Room of Origin	66.000	(18%)	380	(15%)	4.480	(35%)	\$840	(12%)
Confined to Floor of Origin	17.600	(5%)	280	(11%)	1.470	(11%)	\$669	(10%)
Confined to Building of Origin	62.600	(18%)	1.390	(56%)	3.670	(28%)	\$4.198	(61%)
Extended Beyond Building of Origin	10.700	(3%)	350	(14%)	750	(6%)	\$871	(13%)
Total	357.000	(100%)	2.470	(100%)	12.890	(100%)	\$6.866	(100%)
Fire Spread Extended Beyond Room of Origin	90.900	(25%)	2.020	(81%)	5.890	(46%)	5.738	(84%)

The data clearly validates the performance objective listed in Section 5, page 139 that describes limiting the fire to the room of origin. Achieving this performance objective greatly decreases property damage and more importantly, decreases the chance of fire related deaths.

As part of NWFD's fire risk analysis for occupancies, a risk scoring system was developed that included measuring 17 variables that collectively contribute to an overall occupancy risk score. An internal risk assessment team was created to develop this tool. The team consisted of three Prevention/Safety Division personnel and three Operations Division personnel, facilitated by the accreditation manager. If the occupancy was sprinklered, the overall score was reduced by 50%. Titled the Occupancy Risk Assessment Profile, (ORAP) it is based on early versions of occupancy vulnerability assessment profile models developed by various entities.

The ORAP form used in the process is located in Appendix 3.C. ORAP calculations were performed for 24 types of common occupancies in NWFD, as well as specific occupancies (a total of 161 occupancies) as identified by station company officers as being at a higher risk for fire in their associated first-due areas. The 24 common occupancies and their associated rating category are listed in Figure 3.23 the additional 161 individual ORAP scores can be located in Appendix 3.D.

¹⁶ <http://www.nfpa.org/news-and-research/fire-statistics-and-reports/fire-statistics/fires-by-property-type/residential/home-structure-fires>



Figure 3.23
Common Occupancy ORAP Scores and Associated Risk Category

Occupancy	Risk Assessment Score*	Risk Category
Fast food restaurant, sprinklered	18	Moderate
Convenience market, sprinklered	31	Moderate
Typical building in a business park development, sprinklered	32	Moderate
Medium size commercial strip center/mall, sprinklered	34	Moderate
Fast food restaurant, non-sprinklered	36	High
Small occupancy assisted care facility, (<10), sprinklered	36	High
Typical elementary/middle school	38	High
Single family home >3500 sq. ft., sprinklered	44	High
Medium occupancy assisted care facility (10-49 occupants)	46	High
Typical large shopping center	48	High
Typical large garden apartments, sprinklered	51	High
Self-storage facilities, non-sprinklered	55	High
Retail big box, >100,000 sq. ft.	55	High
Convenience market, non-sprinklered	56	High
Two to four-story hotels	58	High
Typical large grocery store	62	High
Large assisted care facility (>50 occupants) sprinklered	63	High
Typical building in business park development, not sprinklered	64	High
Single story residence <3500 sq. ft. non-sprinklered	71	High
Mobile home	73	High
Small occupancy assisted care facility, non-sprinklered	77	High
Single family home >3500 sq. ft., not sprinklered	77	High
Two story residence <3500 sq. ft.	79	High
Typical large garden apartments, not sprinklered	106	Maximum

*Moderate Risk ≤35, High Risk 35-79, Maximum Risk ≥80



Typical high-density, single-family residence neighborhood in NWFD.
Non-sprinklered single-family residences are categorized as a high fire risk.



Typical non-sprinklered, garden style multi-structure apartment complex in NWFD. This type of occupancy is categorized as a maximum fire risk.



Fire Risk Categories

In alignment with CFAI's *Community of Risk/Standard of Cover Manual*, 6th Edition, NWFD has grouped fire risk into four levels of categorization: low, moderate, high, and maximum.

Fire Risk Category	General Description of Associated Risk
Low	Car fires, dumpster fires, small storage shed fires and other similar sized fires not endangering structures.
Moderate	Sprinklered small to medium sized retail and office occupancies.
High	Non-sprinklered mobile homes and single-family residences, all non-sprinklered small to medium commercial occupancies, large sprinklered occupancies.
Maximum	Non-sprinklered large apartment complexes and several individual various types of occupancies.

Fire Critical Tasks

Fire Low Risk	
Task	Personnel Required
Command, size-up, safety	1
Pump operator	1
Deployment and operation of fire attack line	2
Total Effective Response Force	4
<i>ERF assignment = 1 engine company</i>	

Fire Moderate to High Risk	
Task	Personnel Required
Incident Command	1
Incident Safety	1
Water supply and pump operation	1
Assist with water supply as needed, EMS as needed	2
Deployment and operation of initial fire attack line and primary search	3
Second line deployment or back up line	4
Ventilation, utilities, other support functions as needed	4
On deck, RIC	4
Total Effective Response Force	20
<i>ERF assignment = 4 engine companies*, 1 rescue company, 1 incident safety officer, 1 battalion chief. A tender is added to the assignment if the incident is in an area without hydrants.</i>	

*Where ladder apparatus are housed, station captains have the discretion of taking the ladder in place of the engine, depending on occupancy and access. A second alarm duplicates the initial ERF.

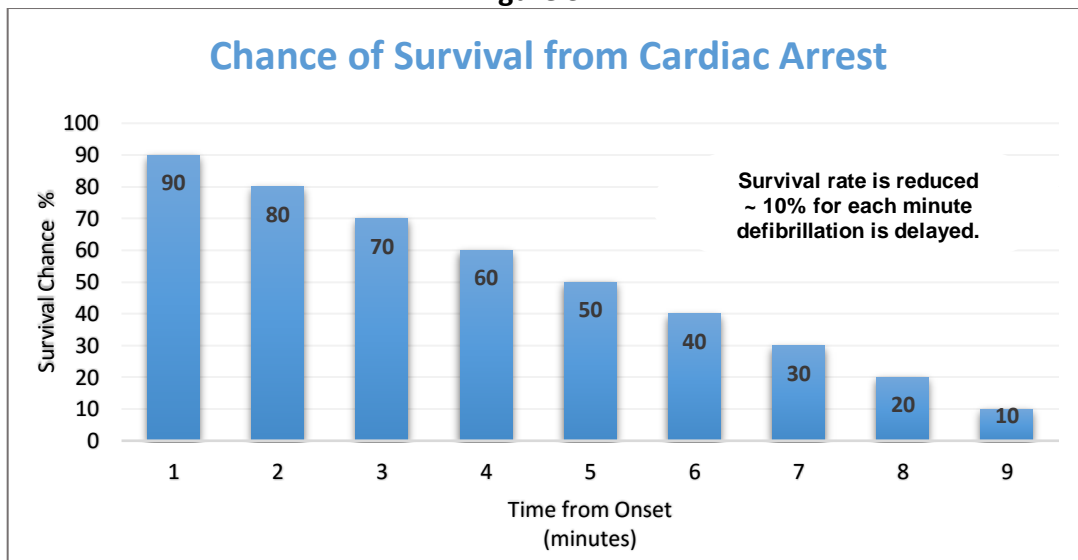


Fire Maximum Risk	
Task	Personnel Required
Incident Command	1
Assist IC	1
Incident Safety	1
Water supply and pump operation	1
Assist with water supply as needed. EMS as needed.	2
Deployment and operation of initial fire attack line and primary search.	3
Second line deployment and assist with primary search if needed.	3
Second water supply source	1
Exposure or other critical task support as needed	4
Search/rescue, ventilation, utilities, other support functions as needed	8
On deck, RIC	4
Total Effective Response Force	29
ERF assignment = 4 engine companies, 2 ladder companies, 1 rescue company, 1 incident safety officer, 2 battalion chiefs.	

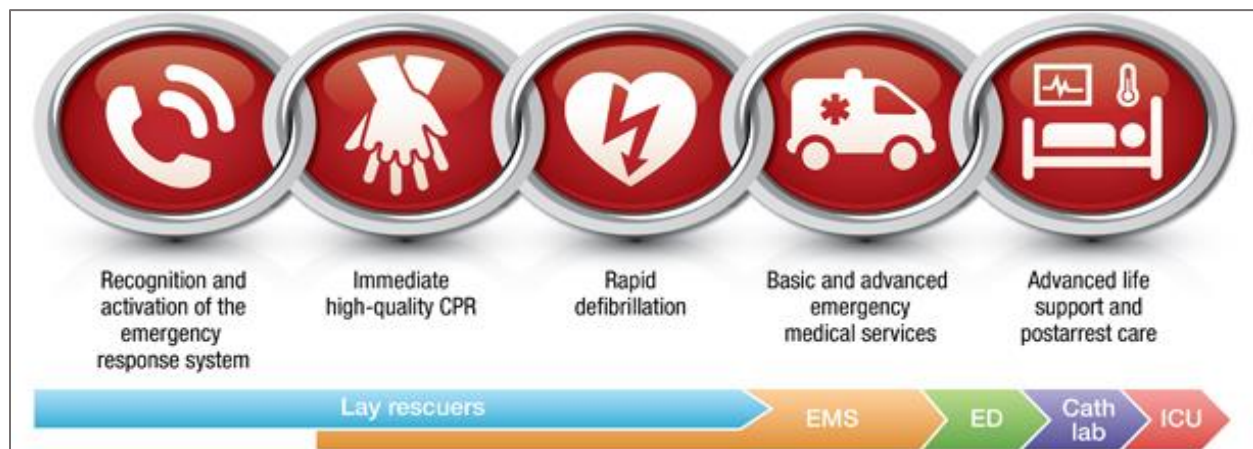
EMS Risk Assessment

The risk assessment approach for EMS involved primarily a call type and history process; however, information was also utilized from sources such as the American Heart Association and the National Institutes of Health to help assess the EMS risk. Both serious medical and trauma conditions are very time sensitive. Figure 3.24 shows the relationship of time and survival regarding a cardiac event.

Figure 3.24



The American Heart Association has five key elements of life-threatening medical emergencies, known as the Chain of Survival:



A strong Chain of Survival can improve chances of survival and recovery for victims of heart attack, stroke, and other medical emergencies. The first three links are predicated on actions prior to the arrival of NWFD resources. Educating the public about the importance of activating the 911 system as soon as a serious medical emergency is discovered is a key element in the first link listed, along with expeditious call processing (alarm handling) at the dispatch center. NWFD is actively seeking to improve the delivery of immediate high-quality CPR and rapid defibrillation. The EMS Division has these two links as prominent items as one of its objectives for Goal #5 of the current strategic plan¹⁷. In line with this objective, within the period of the current strategic plan (2016-2019) the EMS and Prevention & Safety Divisions will initiate a wide reaching hands-free CPR training effort within the NWFD community.

The remaining two links of the AHA Chain of Survival are part of the EMS service delivery system. As described in Section 4, Current Deployment and Performance, an advanced life support call receives an engine company with a minimum of one paramedic on board and one rescue-ambulance with a minimum of one paramedic on board. In combination with evidence-based ALS practices, units are located such that the times associated with the medical and trauma risks identified are minimized to help optimize positive patient outcomes.

The well-known Golden Hour, the hour immediately following traumatic injury to the time of the patient reaching surgery at an appropriate definitive trauma care facility, is a key element when assessing serious trauma risk. This type of injury is very time critical and given a high level of consideration when reviewing current concentration and distribution of resources and planning for the future. Figures 3.25, 3.26 and 3.27 illustrate the EMS call distribution and call types in 2015.

¹⁷ Objective 5.F as listed in the NWFD Strategic Plan – “Educate the public in ways to prevent medical emergencies and/or ensure the best possible outcome when they do occur.”

Figure 3.25

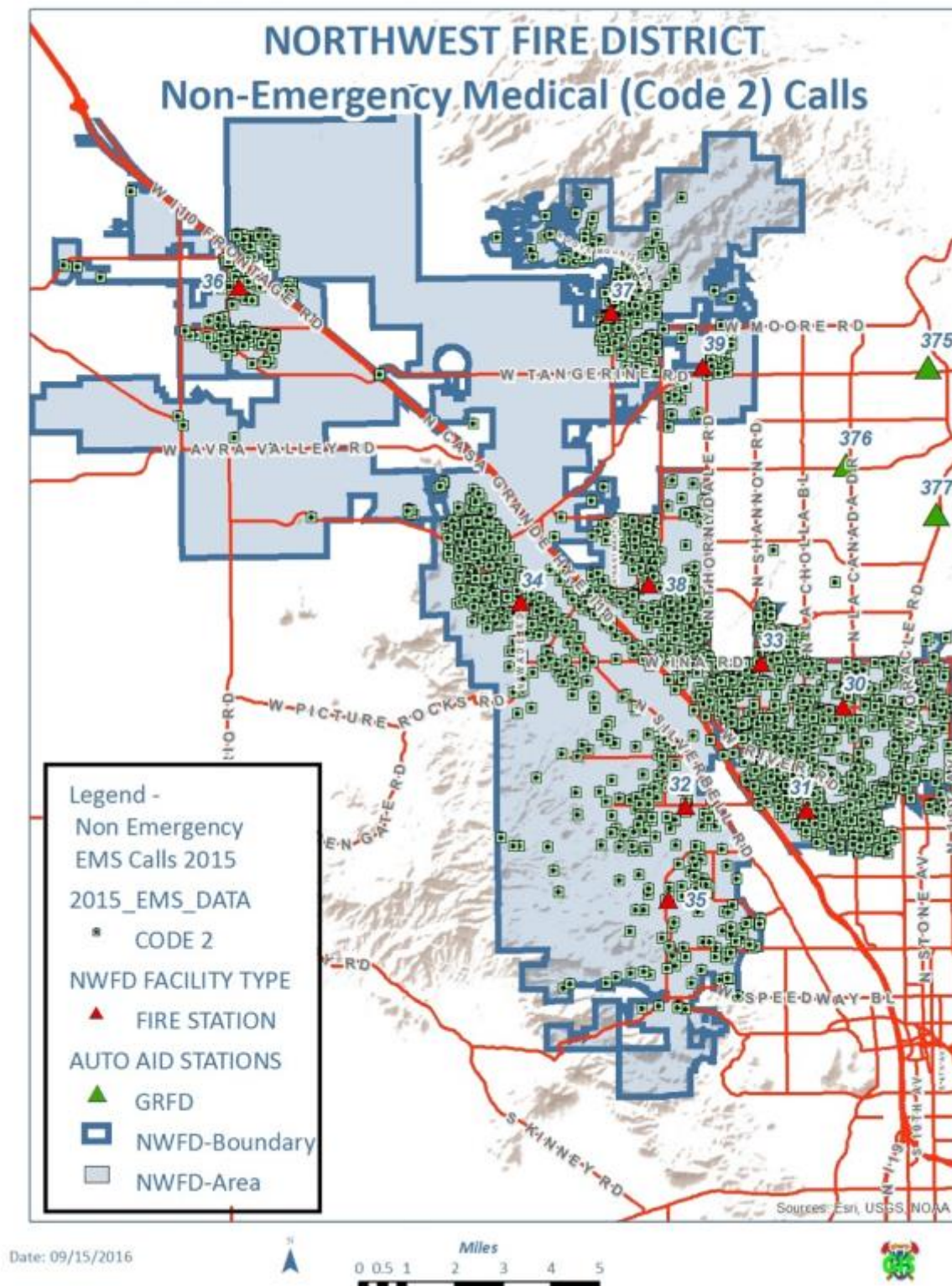


Figure 3.26

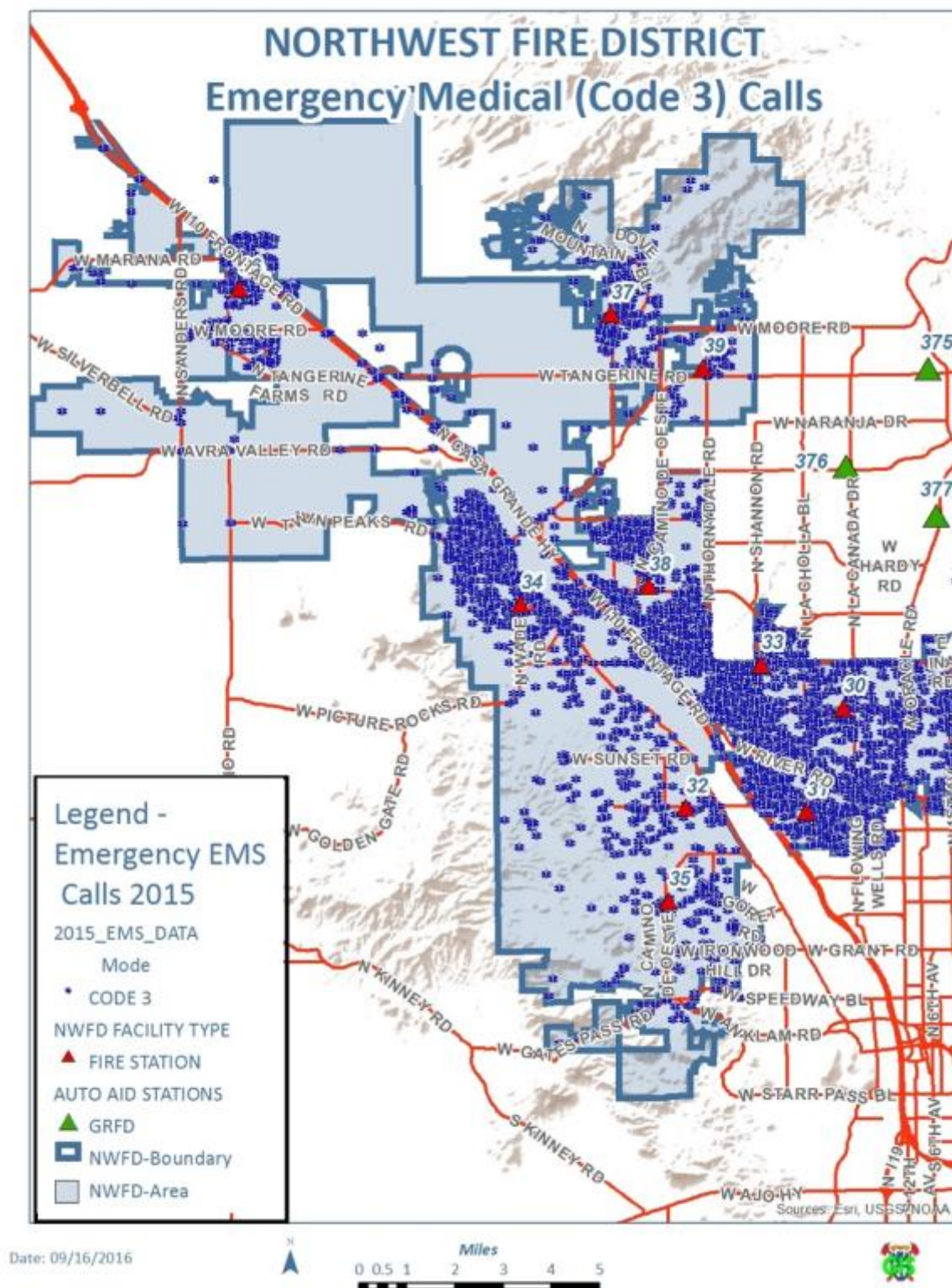
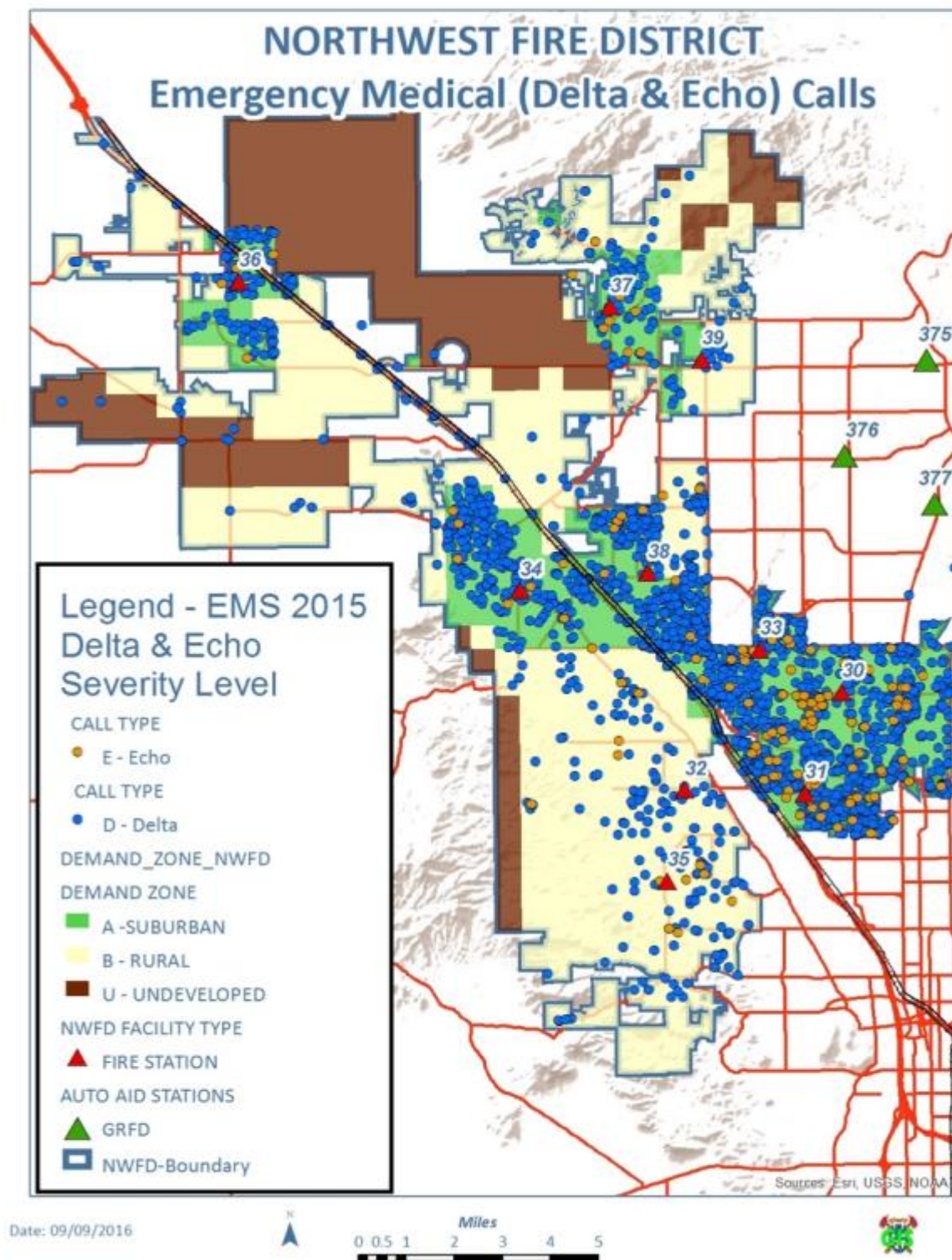
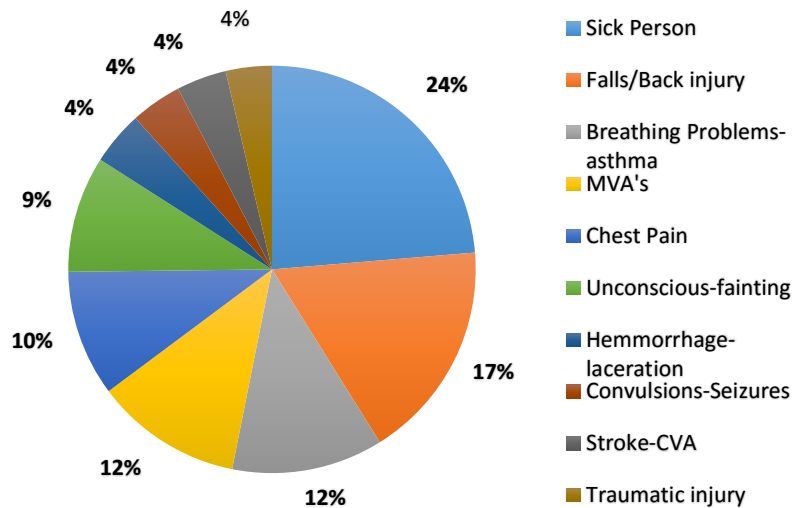


Figure 3.27



Delta and Echo medical calls are patient classifications utilized by the **Medical Priority Dispatch System** (MPDS), they represent the two most serious patient condition classifications.

2011-2015 Top 10 EMS Call Types (represents 75% of all EMS calls)



All call types and the associated volume for 2011-2015 can be referenced in Appendix 3.E.

EMS Risk Categories

The following risk categories were created as a result of the EMS risk assessment.

EMS Risk Category	General Description of Associated Risk
Low	Injured or ill patient without airway, breathing, circulatory problems and that do not meet any additional risk criteria.
Moderate	Special criteria patient: ST-elevated myocardial infarction (STEMI), severe respiratory distress, time sensitive issues cerebrovascular accident, traumatic brain injury, and any patient meeting trauma center or other specialized medical facility criteria. Advanced life support required.
High	High mechanism of injury (rollover MVA, pedestrian/cyclist struck, and motorcyclist down) and drowning.
Maximum	Multi-patient incident (up to 6 trauma patients).

EMS Critical Tasks

EMS Low Risk (NWFD dispatch code BLS 1)	
Task	Personnel Required
Command, scene safety/management	1
EPCR documentation, patient assessment, and care	3
Total Effective Response Force	4*
<i>ERF assignment = 1 engine company</i>	

*Engine determines need for patient transport; BLS or ALS ambulance is then added to the assignment as necessary.



EMS Moderate Risk (NWFD dispatch code BLS 2, ALS 1, ALS 2)	
Task	Personnel Required
Command, scene safety/management	1
EPCR documentation, patient assessment, and care	3
Assist with patient care as necessary, provide patient transport	2
Total Effective Response Force	6
<i>ERF assignment = 1 engine company, 1 rescue company</i>	

EMS High Risk (NWFD ALS 3, ALS 4)	
Task	Personnel Required
Command, scene safety/management	1
Scene stabilization, LZ establishment if necessary	4
EPCR documentation, patient assessment, and care	4
Assist with patient care as necessary, provide patient transport	2
Total Effective Response Force	11
<i>ERF assignment = 2 engine companies, 1 rescue company, 1 BC or EC</i>	

EMS Maximum Risk (NWFD full medical alarm)	
Task	Personnel Required
Command, scene safety/management	1
Incident Safety	1
Medical Group supervisor	1
EPCR documentation, patient assessment, and care	12
Assist with patient care as necessary, provide patient transport	6
Total Effective Response Force	21*
<i>ERF assignment = 3 engine companies, 3 rescue companies, 1 EMS captain, 2 battalion chiefs</i>	

*Additional engine companies and rescue/ambulances assigned as incident patient numbers and condition dictate.



Hazardous Materials Risk Assessment

In the summer of 2016, Special Operations team members updated the previous risk assessment performed in 2011. Locations of hazmat high-risk occupancy and transportation related risks are provided in Figures 3.28 and 3.29

Figure 3.28

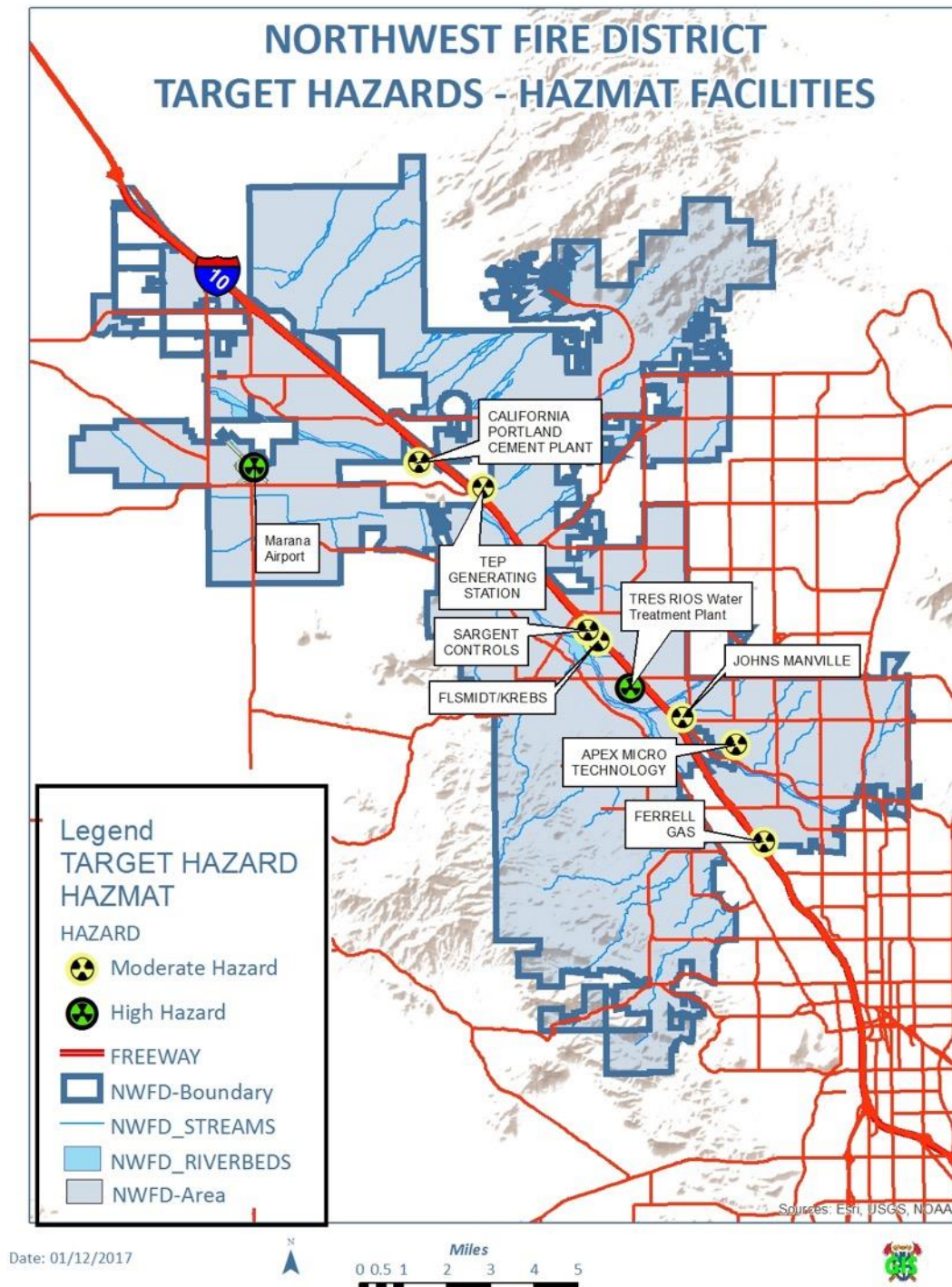
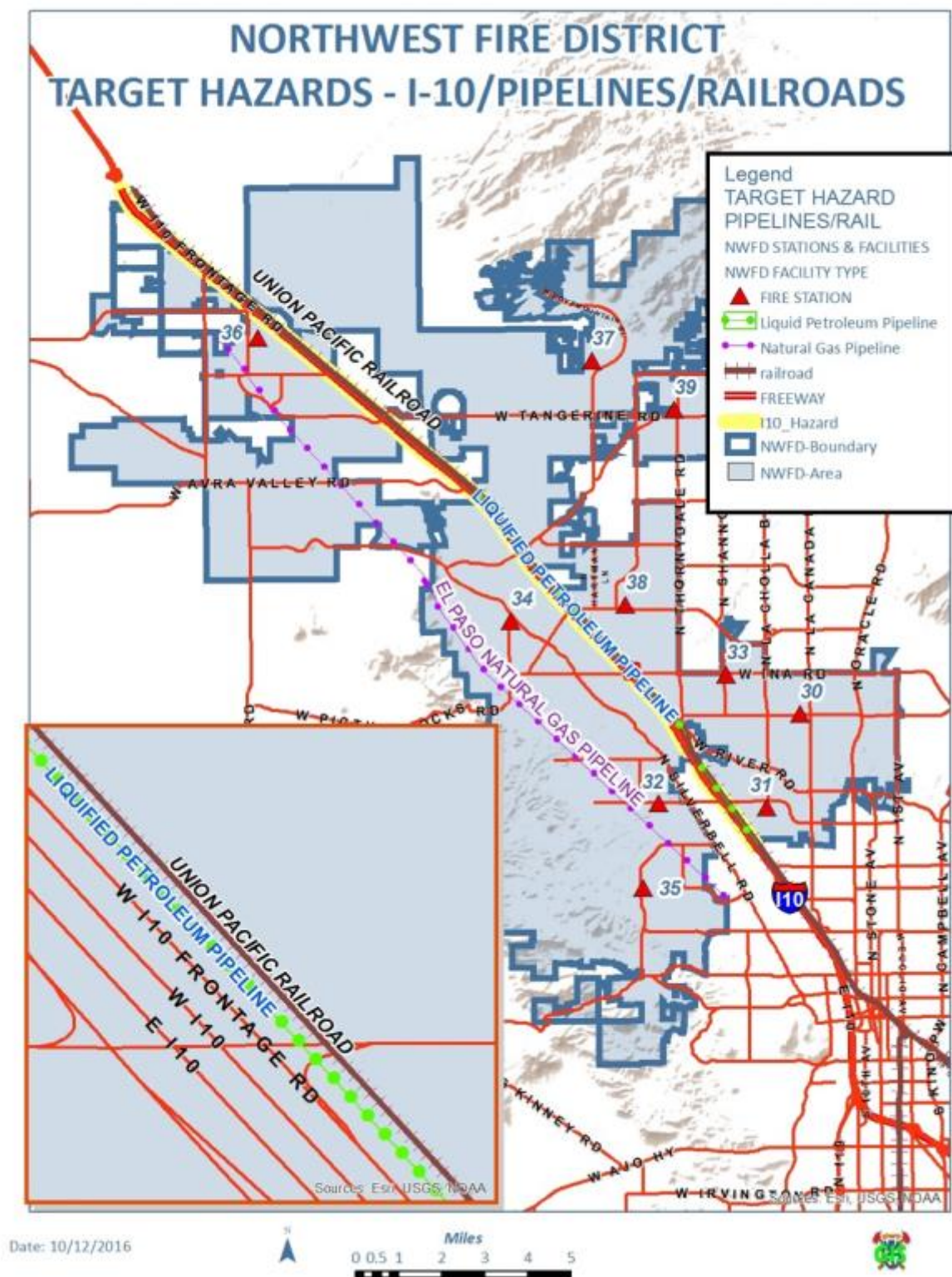


Figure 3.29





Hazmat Risk Category

Hazmat Risk Category	General Description of Associated Risk
Low	Residential CO alarms, small fuel spill containments, unknown hazmat investigations. Entry into a toxic environment not required. Specialized hazmat equipment and technician level knowledge/skills not required.
Moderate	Larger flammable liquid spills, natural gas leaks, unknown substance spill. Air monitoring and possible other specialized hazmat equipment required. Technician level knowledge/skills required.
High	Large hazardous materials spills or releases, Level A or B entry required.
Maximum	Large uncontained quantities of hazardous materials affecting a large spatial area. Critical tasks exceed NWFD's resources to mitigate.

Hazmat Critical Tasks

Hazmat Low Risk	
Task	Personnel Required
Command, size-up, safety	1
Operations level mitigation efforts including identification, evacuation as necessary, spill containment.	3
Total Effective Response Force	4
<i>ERF assignment = 1 engine company</i>	

Hazmat Moderate Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Isolation, evacuation, identification	4
Technician level tasks including identification, air monitoring, evaluation of possible containment of product	4
EMS stand-by	2
Total Effective Response Force	12
<i>ERF assignment = 1 engine company, 1 special operations engine company, 1 special operations apparatus, 1 special ops rescue, 1 incident safety officer, 1 battalion chief</i>	



Hazmat High to Maximum Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Isolation, evacuation, identification	4
Technician level tasks including identification, air monitoring, possible containment efforts of product, potential Level A or B entry, hazmat safety.	10
Decon	4
EMS stand-by	2
Total Effective Response Force	22*
<i>ERF assignment = 2 engine companies, 2 special operations engine companies, 1 special operations apparatus, 1 special operations rescue company, 1 rescue company, 1 incident safety officer, 1 battalion chief</i>	

* Additional regional resources can be requested through existing automatic and mutual aid agreements as the incident dictates.

Technical Rescue Risk Assessment

Like hazardous materials responses, technical rescue responses are tiered in nature. NWFD relies on responding the closest company to the event to evaluate the nature of the scenario, recognizing limitations or capabilities of the individual company. Successful outcomes depend on the awareness of call takers, dispatchers, and company officers to recognize the event and call appropriate resources early. All companies throughout the District have received awareness level training and have limited equipment within the scope of their training. The hazardous materials team members also are trained to the operations level to support the technical rescue team in achieving critical task completion. Companies from both teams train together and support one another to achieve initial response force effectiveness. Fire officers may choose to continue large-scale responses or reduce the response force for incidents, depending on additional information received en route or conditions found upon arrival. Special Operations personnel performed the risk assessment for the five Technical Rescue disciplines.

Extrication Risk Categories

NWFD's emergency extrication services primarily consists of vehicle extrications. Interstate 10 and the primary arterial roadways are where the vast majority of these types of extrications take place. Extrications range from relatively simple "child locked in a car" to complex multi vehicle extrications involving semi-trucks on Interstate 10. It should be noted that any motor vehicle accidents on the interstate whether there is a need for extrication or not, include an incident safety officer on the initial dispatch.



Extrication Risk Category	General Description of Associated Risk
Low	Non-technical extrications such as elevator rescues, vehicle lockouts (with occupants such as a child or pet).
Moderate	Extrications requiring power driven rescue tools but not requiring any “specialized” rescue tools or training beyond the capabilities of a standard engine company.
High	Involving complex extrication tasks and/or potential multiple extrications, rail, aircraft, large truck, heavy equipment, etc. Requires specialized skills and extrication equipment.

Extrication Critical Tasks

Extrication Low Risk	
Task	Personnel Required
Command, size-up, safety	1
Rescue actions, generally light tools only	3
Total Effective Response Force	4
<i>ERF assignment = 1 engine company</i>	

Extrication Moderate Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Extrication	4
Patient triage, treatment	4
Patient transport	2
Total Effective Response Force	12
<i>ERF assignment = 2 engine companies, 1 rescue company, 1 incident safety officer, 1 battalion chief</i>	

Extrication High Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Extrication	8
Patient triage, treatment	8
Patient transport	4
Total Effective Response Force	22
<i>ERF assignment = 1 engine company, 2 special operations engine companies, 1 squad, 2 rescue companies, 1 incident safety officer, 1 battalion chief</i>	

Low-High Angle Rescue Risk Categories

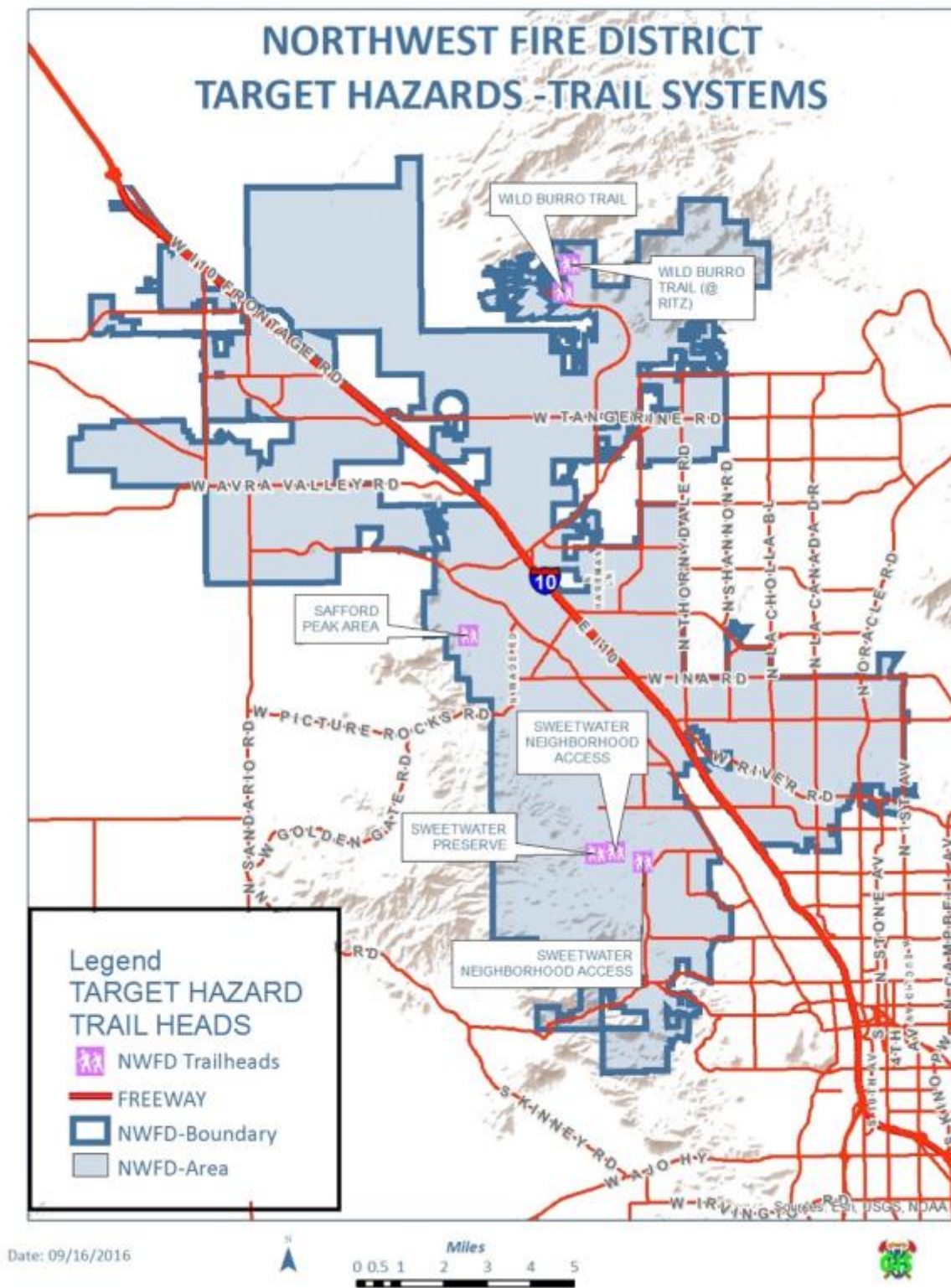
The Tucson Mountains have a robust system of developed trails, and are frequented by hikers, equestrians, and mountain bikers whose experience level varies from limited to very experienced. Low angle rescue occurs frequently with outdoor enthusiasts such as hikers, mountain bikers and equestrians. The Tortolita Mountains has a similar network of trails that traverse through moderate to very rough terrain. Low angle rescue occurs frequently; high angle rescues are relatively rare. The increase in popularity of outdoor activities by residents in the Tucson area combined with the number of inexperienced users from a large destination resort at the base of the Tortolita Mountains has significantly increased the frequency/probability of these technical rescue calls. The complexity of rescues in this environment ranges from hiker dehydration on low angle trails to fall injuries in complex high angle situations. Figure 3.30 illustrates areas of the trail systems where these types of rescues are most likely to occur.



Sweetwater Preserve Trailhead, in Station 32's first-due area, part of an extensive hiking and mountain bike trail system in the Tucson Mountains.

Low-High Angle Rescue Risk Category	General Description of Associated Risk
Low	Low angle rescue generally involving non-ALS needs and victim is accessible by foot generally within a quarter to half mile.
Moderate	Low angle rescue that could involve ALS patient and may be more than half-mile by foot.
High	Low to high angle rescue that could be ALS patient, be at an excessive distance from trailhead, and involve specialty rescue equipment, or possible nighttime operation.

Figure 3.30





Low-High Angle Rescue Critical Tasks

Low Angle Rescue - Low Risk	
Task	Personnel Required
Incident command	1
Patient access and evaluation/treatment	3
Patient access and removal	3 (sequential following eval/treatment)
Total Effective Response Force	4*
<i>ERF assignment = 1 engine company</i>	

*First-due crew makes determination on need for patient transport, if needed, appropriate BLS or ALS unit is added to the call. Depending on initial information received, ALS unit may be part of initial assign.

Low to High Angle Rescue – Moderate to High Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Patient access and removal	4
Rescue system set up implementation, pt. packaging	6
Patient transport	2
Total Effective Response Force	14*
<i>ERF assignment = 1 engine company, 1 special operations engine company, 1 squad, 1 special ops rescue company, 1 rescue company, 1 incident safety officer, 1 battalion chief</i>	

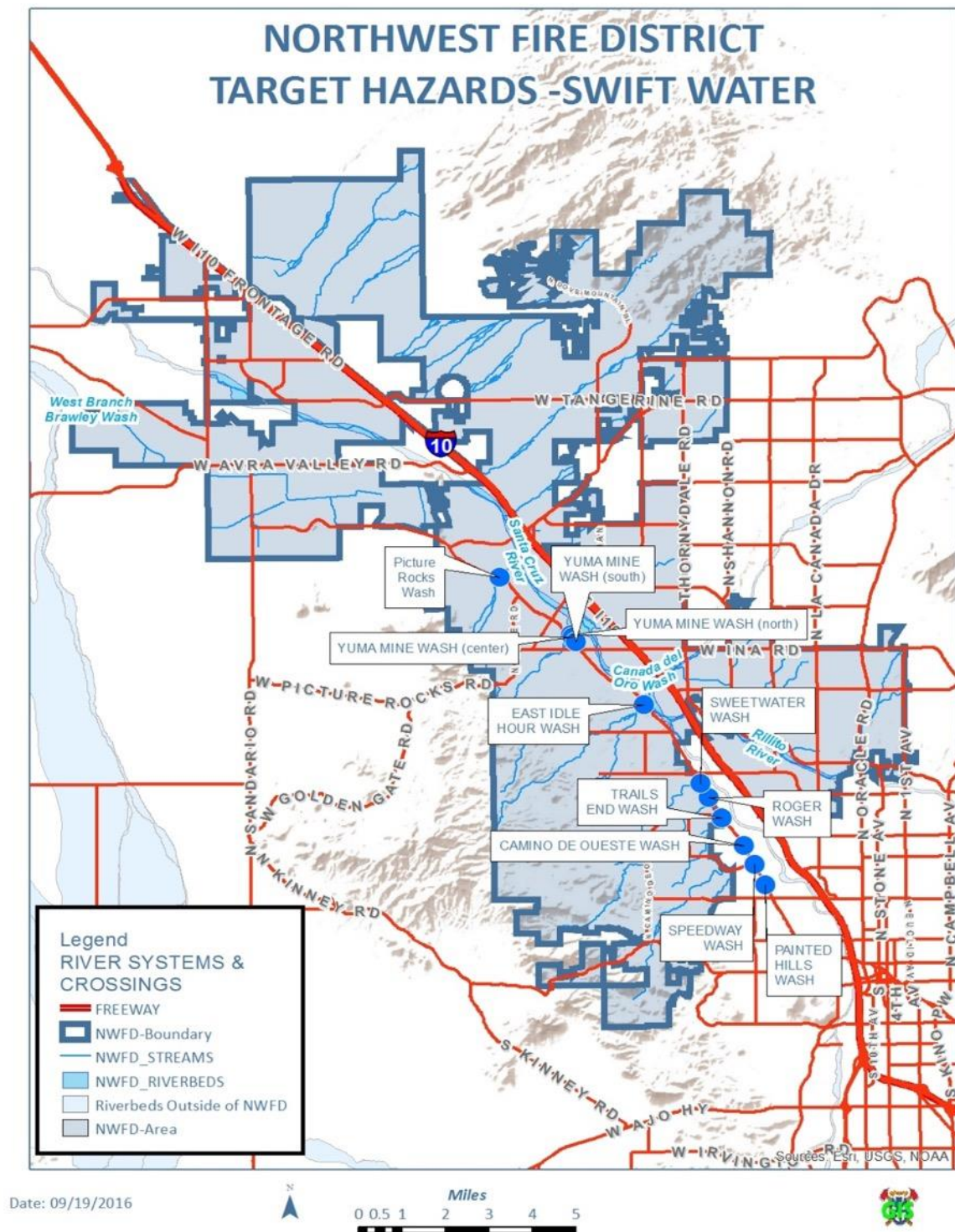
*Depending on complexity/conditions of rescue, an additional special operations engine may be requested, as well as additional engine companies and regional resources for support.

Swift Water Risk Categories

NWFD has numerous roads with dry wash crossings that can quickly fill with floodwaters during times of heavy rainfall and create the potential for swift water rescues. The largest concentrations of these washes are located in the Western portion of the District, but due to the area topography and ever-present road construction projects, there is little area in NWFD that is not periodically subject to heavy, unmanaged runoff. The Santa Cruz River runs south to north through the District, and provides drainage for a watershed area that reaches as far south as the International Border with Mexico. This drainage, though normally only containing a small stream of water from the Tres Rios Waste Water Treatment Plant, has the potential for becoming a raging river with water depths of over 20 feet, and up to a ¼ mile wide in places.

The Canada del Oro and Rillito Rivers and other local washes also have the capability for significant swift water flows. Though the Central Arizona Canal in the Northwest portion of the District is completely fenced and under security enforcement, it possesses the potential to entrap canal workers, or others who may breach the security measures. Smaller agriculture irrigation related canals are present in the northwestern area of the District can be the source of water rescues as these often run along established roadways and are unprotected by any sort of traffic barriers. Figure 3.31 illustrates the areas of highest potential for swift water related rescues.

Figure 3.31





Swift Water Rescue Risk Category	General Description of Associated Risk
Low	Non-technical rescues, i.e. slow moving, non-rising water.
Moderate	Rising water with velocity that makes the vehicle unstable or exceeds capabilities of standard engine company.
High	Swift moving and/or rising water with dynamic flow characteristics requiring specialized equipment and tech level training.

Critical Tasks for Swift Water Risk Classifications

Swift Water Rescue – Low Risk	
Task	Personnel Required
Command/scene safety	1
Rescue tasks	3
Total Effective Response Force	4
<i>ERF assignment = 1 engine company</i>	

Swift Water Rescue – Moderate Risk	
Task	Personnel Required
Command	1
Scene safety	1
Shore operations	4
Technical operations	6
Patient transport	2
Total Effective Response Force	14
<i>ERF assignment = 1 Battalion Chief, 1 EC, 1 engine company, 1 Special Ops Engine, 1 Special Ops vehicle, 1 Special Ops Rescue, 1 Rescue</i>	

Swift Water Rescue - High Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Spotters	3
Rigging system set up and implementation	4
Shore team or boat team	4
Ladder company related functions	4
Scene committed EMS	2
Technical rescue safety	1
Patient transport	2
Total Effective Response Force	22
<i>ERF assignment = 1 engine company, 2 special operations engine companies, 1 heavy squad, 1 ladder, 1 special ops rescue, 1 rescue company, 1 incident safety officer, 1 battalion chief</i>	



Trench Rescue Risk Categories

NWFD is currently experiencing a relatively high level of both residential and roadway construction; as such, there are a numerous open utility construction trenches at any given time. Loose sandy soils that are often prevalent near major drainage features can significantly contribute to trench collapses, but pockets of this type of soil can occur in isolated areas throughout the District. *Trench rescue operations are categorized as a singular high-risk.*

Trench Rescue Critical Tasks

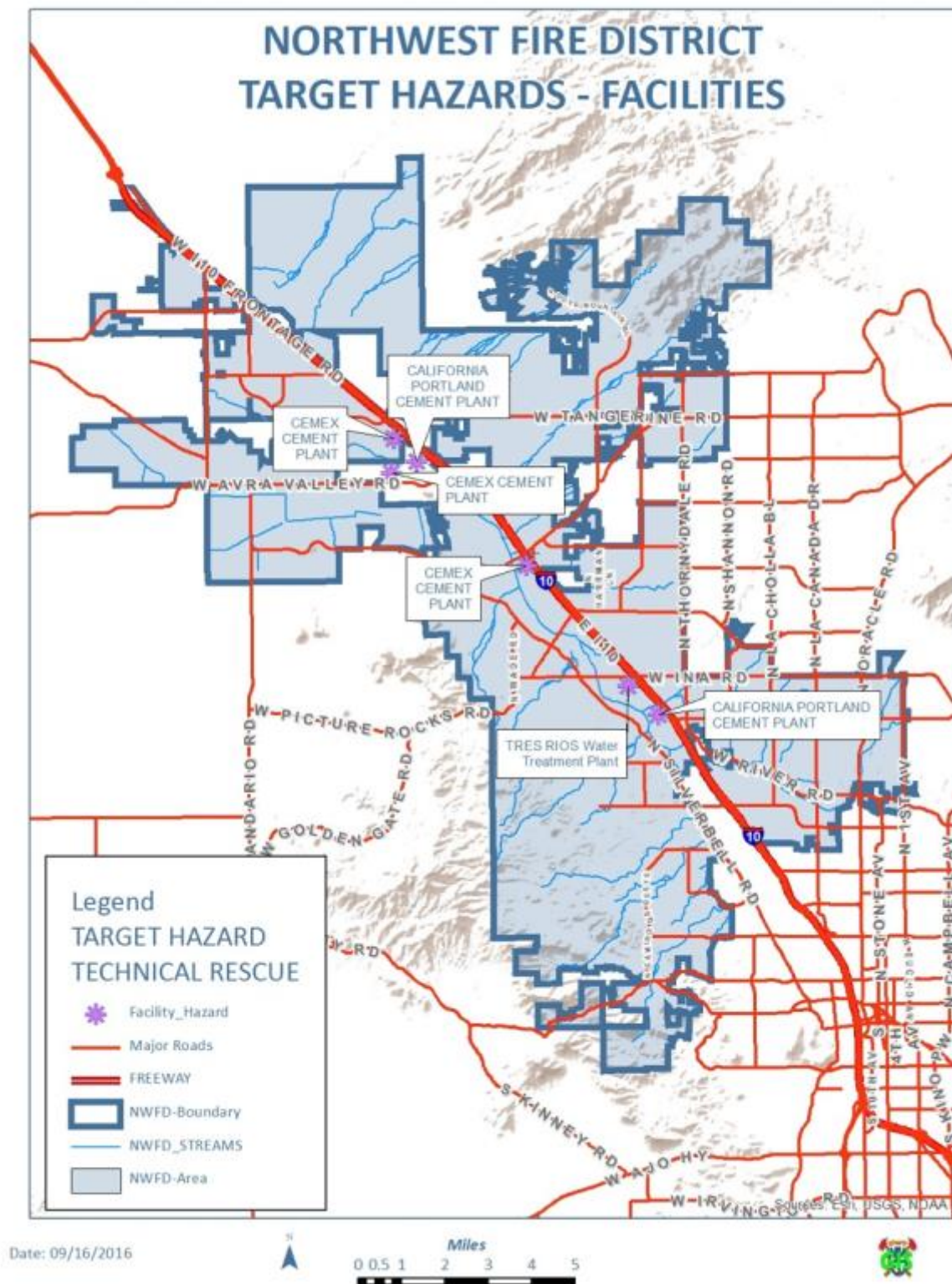
Trench Rescue - High Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Shoring leader	1
Shoring teams	6
Panel teams	6
Ladder company related functions	4
Technical rescue safety	1
Patient transport	2
Total Effective Response Force	22*
<i>ERF assignment = 1 engine company, 2 special operations engine companies, 1 heavy squad, 1 Ladder, 1 special ops rescue, 1 rescue company, 1 incident safety officer, 1 battalion chief</i>	

*Additional NWFD and regional resources can be requested as complexity and conditions dictate.

Confined Space Risk Categories

The Tres Rios Waste Water Treatment plant has numerous facilities where confined space rescue techniques may be required. Additionally, there are numerous construction and manufacturing companies located along the I-10 corridor that have conveyor belts, shafts, and other buildings that have a high risk of confined space incidents. Utility company underground vaults are located throughout the District and the Central Arizona Project have confined spaces at its pumping station in the northwest area of the District. Figure 3.32 identifies the locations of confined spaces and other potential special rescue needs. *Confined space operations are categorized as a singular high-risk.*

Figure 3.32





Confined Space Critical Tasks

Confined Space - High Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Entry and back-up	4
Air monitoring	2
Rigging	2
Technical rescue safety	1
Communication	1
Technician support	4
Ladder company related functions	4
Patient transport	2
Total Effective Response Force	22*
<i>ERF assignment = 1 engine company, 2 special operations engine companies, 1 squad, 1 ladder, 1 special ops rescue, 1 rescue company, 1 incident safety officer, 1 battalion chief</i>	

*Additional regional resources can be requested as the incident dictates.

Structural Collapse Risk Categories

The majority of residential and commercial structures in NWFD are relatively new, constructed within the past 20-40 years and built under recognized building codes. As such, the risk for structural collapse is relatively low. There are normally several moderate to large-scale construction projects in progress in the District at any one time that can pose a higher risk of structural collapse, depending on the stage of construction. As discussed in Section 1, the risk for damaging earthquakes that could trigger structural collapse is relatively low.

Structural Collapse Risk Category	General Description of Associated Risk
Moderate	Any indication of structural instability with rescue
High	Indication of actual collapse



Structural Collapse – Moderate Risk	
Task	Personnel Required
Command	1
Scene safety	1
Shore Operations	4
Technical Operations	6
Transport	2
Total Effective Response Force	14
<i>ERF assignment = 1 battalion chief, 1 EC, 1 engine company, 1 special ops engine company, 1 special ops vehicle, 1 special ops rescue company, 1 rescue company</i>	

Structural Collapse - High Risk	
Task	Personnel Required
Incident command	1
Scene safety	1
Technical rescue safety	1
Technical rescue supervisor	1
Stabilization and rescue efforts	16
Patient transport	2
Total Effective Response Force	22*
<i>ERF assignment = 2 engine companies, 2 special operations engine companies, 1 heavy squad, 1 special operations rescue company, 1 rescue company, 1 incident safety officer, 1 battalion chief</i>	

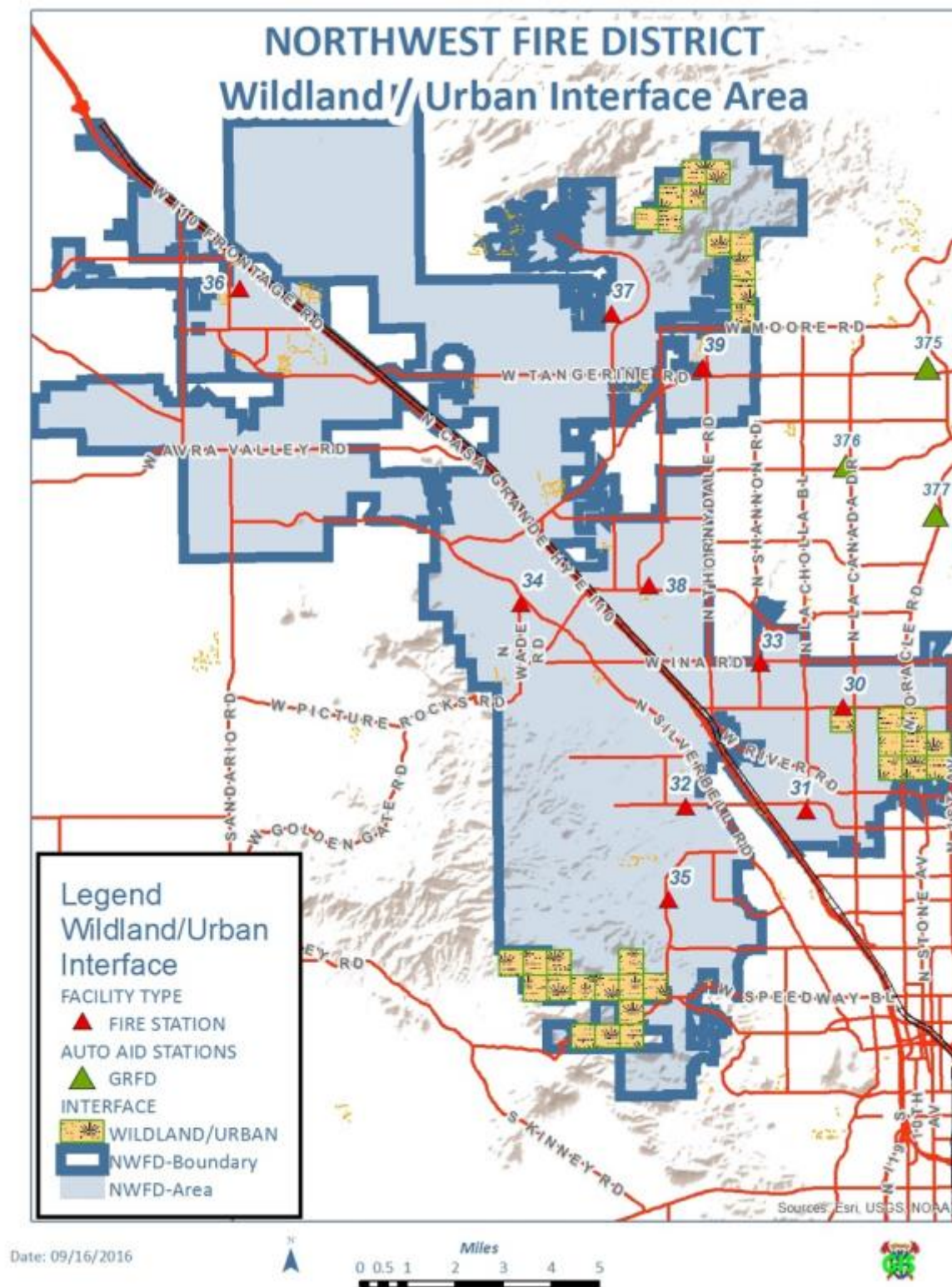
*Additional regional resources can be requested as the incident dictates.

Wildland Fire Risk Assessment

NWFD has substantial amounts of undeveloped area, the dominant fuel model being light grass/shrub type. There are areas of the District where this fuel model borders some developed areas, primarily medium to large single-family residences on larger lots. This area represents the wildland urban interface in the District that can be defined as locations in which the District has determined that topographical features, vegetation fuel types, local weather conditions, and prevailing winds result in the potential for ignition of the structures within the area from flames and firebrands of a wildland fire¹⁸. These areas of moderate to high-risk wildland urban interface have been identified, see Figure 3.33.

¹⁸ Definition source: NFPA 1143, Standard for Wildland Fire Management, 2014 Edition

Figure 3.33





Wildland Risk Categories

Wildland Risk Category	General Description of Associated Risk
Low	Small size natural vegetation fire approximately <1 acre
Moderate	Medium size natural vegetation fire approximately 1 to 3 acres
High	Large size natural vegetation fire >5 acres and/or vegetation fire encroaching on critical infrastructure or within the Wildland/Urban Interface environment.

Wildland Fire Critical Tasks

Wildland Low Risk	
Task	Personnel Required
Command, size-up, safety	1
Pump operation	1
Deployment and operation of fire attack line and hand tools	2
Total Effective Response Force	4
<i>ERF assignment = 1 engine company</i>	

Wildland Moderate Risk	
Task	Personnel Required
Incident Command	1
Incident Safety	1
Pump operation	1
Mobile water supply	1
Deployment and operation of initial fire attack line and hand tools.	4
Advancement/extension of fire attack lines as necessary and small scale line construction as necessary.	2-4
Total Effective Response Force	10-12
<i>ERF assignment = 1 engine company, 1 wildland engine company, 1 tender, 1 incident safety officer, 1 battalion chief.</i>	



Wildland High Risk (WUI)	
Task	Personnel Required
Incident Command	1
Incident Safety	1
Pump operation	1
Mobile water supply	2
Deployment and operation of initial fire attack line and hand tools.	3
Advancement/extension of fire attack lines as necessary and small scale line construction as necessary.	4-8
Initial structure protection	12
Total Effective Response Force	24-28*
<i>ERF assignment = 4 engine companies, 2 wildland engine companies, 2 tenders, 1 rescue company, 1 incident safety officer, 1 battalion chief.</i>	

* Additional regional and state resources (Arizona Department of Forestry and Fire Management) can be requested through existing automatic and mutual aid agreements as the incident dictates.



Example of Wildland/Urban Interface in Station 30's first-due eastside area; many homes in WUI areas have challenging driveways for fire apparatus accessibility.



Aviation Rescue Fire and Firefighting (ARFF) Risk Assessment

NWFD has one airport within its boundaries. The Marana Regional Airport is in the southern half of Station 36's first-due area and is classified as a general aviation reliever airport for the Tucson International Airport. The airport is home to more than 260 based aircraft and had more than 90,000 takeoffs and landings in 2014. The airport's main runway is 6,901 feet and the crosswind runway is 3,892 feet. Station 36 is the closest NWFD facility, approximately six miles from the airport.

In recent years, the airport has seen an increase in business jet traffic that includes aircraft with capacities up to 19 passengers. There is a medical helicopter currently based at the facility. Various branches of the military utilize the airport for a variety of training missions. The tragic outcome of one of these training missions resulted in the single largest loss of life in the history of NWFD. In 2000, an MV-22 Osprey crashed at the airport during a nighttime training mission, killing all 19 Marines on board. The site also includes a restaurant, service center, restoration company and flight school. There are future plans for a control tower and corporate complex. At present, there are no plans to seek FAA indexing status regarding ARFF capabilities.

ARFF Risk Categories

ARFF Risk Category	General Description of Associated Risk*
Moderate	Single or twin engine private aircraft, 1-6 passenger capacity
High	Any private jet aircraft, up to 6 passenger capacity
Maximum	Any private jet aircraft, approximately 7-19 passenger capacity, or any military aircraft

*with or without fire involvement

ARFF Critical Tasks

ARFF Moderate Risk	
Task	Personnel Required
Incident Command	1
Incident Safety	1
Water supply, pump operations and tender supply	2
Fire attack (as necessary)	2
Extrication/Rescue	4
Patient treatment	6 *
Total Effective Response Force	12

*includes 2 initially dedicated crew members and reassigned extrication-rescue group



ARFF High Risk	
Task	Personnel Required
Incident Command	1
Incident Safety	1
Water supply, pump operation and tender water supply	1
Fire attack (as necessary)	4
Extrication/Rescue	4
Patient treatment/transport	2
Hazmat functions, assist with extrication and patient care as necessary	6
Total Effective Response Force	19*

*Additional ARFF regional and state resources can be requested through existing mutual aid agreements as the incident dictates.

ARFF Maximum Risk	
Task	Personnel Required
Incident Command	1
Incident Safety	1
Water supply, pump operation, and tender water supply	2
Fire attack (as necessary)	2
Extrication/Rescue	3
Patient treatment/transport	8
Hazmat functions, assist with extrication and patient care as necessary.	12
Total Effective Response Force	29*

* Additional ARFF regional and state resources can be requested through existing mutual aid agreements as the incident dictates.

It is recognized that the initial information Dispatch receives will not likely be available in sufficient detail or accuracy to determine which ARFF risk category the incident falls into. Therefore, the District has chosen to use a singular ERF assignment for all ARFF events that uses the ERF determined for the maximum risk critical tasks, consisting of the following:

- 3 engine companies
- 1 special operations engine company
- 1 special operations rescue company
- 1 rescue company
- 1 ARFF unit
- 1 tender
- 1 incident safety officer
- 1 battalion chief

Depending on the additional information available from Dispatch, the response can be downgraded by the responding Battalion Chief, or additional transport units (ground and air) added to the response.



Marana Regional Airport is experiencing an increase in air traffic volume, including larger business jet aircraft. Photo credit: Keith Charlot



Section 4

Current Deployment and Performance

In addition to a thorough risk analysis and resulting performance objectives, firefighter safety is a guiding principle for NWFD when considering deployment and performance. The District has adopted a universal risk management plan regarding responses to emergencies that align with NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, Chapter 8, 2013 edition as it pertains to risk management at emergency operations and the International Association Fire Chiefs Rules of Engagement (Appendix 4.A):

- We will risk our lives to save savable life.
- We will risk our lives to a lesser degree to save savable property.
- We will not risk anything for life or property that is deemed lost or unsalvageable¹⁹.

NWFD's risk assessment, community expectations and objective data associated with fire behavior and clinical survival are primary factors in setting performance goals. NWFD baseline and benchmark service level objectives are established and approved by the Governing Fire Board and are based on best practice and NFPA standards. These performance objectives (described in detail in Section 5) include alarm handling time, turnout time, travel time and total response time.

NWFD serves its jurisdiction with a higher concentration and distribution of resources in the urban/suburban area of the District verses the rural/undeveloped area of the District. This is in direct response to the higher call volume history and high consequence areas that are common to the urban/suburban areas.

Deployment

Fixed Assets (Facilities)

NWFD deploys its mobile emergency response resources from ten station locations, split into two battalions as illustrated in Figure 2.2, Section 2. Figures 4.1 – 4.17 are a summary of all NWFD facilities, including fire stations (distribution²⁰) and support facilities. A summary of the concentration²¹ of apparatus (mobile assets), staffing, and by category of service delivery follows in Figures 4.18 and 4.19.

¹⁹ NWFD SOG #7110

²⁰ Distribution, as defined by the Commission on Fire Accreditation International is the geographic location of all first-due resources for initial intervention.

²¹ Concentration, as defined by the Commission on Fire Accreditation International is the spacing of multiple resources arranged so that an initial "effective response force" can arrive on scene within the time frames outlined by the response time and on-scene performance objectives.

Figure 4.1


Station 30 - 1520 W. Orange Grove Road - Casas Adobes Station		
	<p>Station 30 was built in 2011 next to the old Station 30. It is located adjacent to the District's Logistics Facility and has the highest call volume of all NWFD stations. It is considered one of the District's "core" stations. Station 30 serves a variety of medical related occupancies including numerous medical offices, several large extended care facilities, a stand-alone surgery center and Northwest Medical Center. The remainder of station 30's area is comprised of a large resort, several large apartment complexes, single family homes and a concentration of retail occupancies along Oracle Road, a major arterial.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and associated rank.	16% 2nd/10 stations
	Assigned Apparatus	<ul style="list-style-type: none"> • Engine 330 • Rescue 330
	Design and Construction	10,000 sq. ft. The building is designed as a "medium" two-bay station and is primarily of masonry construction and classified as a Type III structure. The roof is a built up flat roof.
	Code Compliance and Safety	The station meets all current building and fire codes and is fully sprinklered. The parking area is accessible by access-controlled gates and entry into the building is by push button code system. Apparatus access onto Orange Grove Road is assisted by an Opticom device on the apparatus that activates a flashing warning sign in both directions of travel.
	Staff Facilities	The station currently houses six personnel 24/7 and two Southwest Ambulance personnel. The station has sleeping quarters and living space for nine personnel.
	Efficiency and General Facility Condition	The station currently meets needs, however if there is another company assigned on a full shift basis, there may be a need to relocate a unit. The general condition of the facility is excellent. The paved areas are in need of sealcoating.

Figure 4.2


Station 31 - 4701 N. La Cholla - Flowing Wells Station		
	<p>Station 31 was built in 1996 when it was part of the former Flowing Wells Fire District. It is adjacent to the District's Operations Headquarters and is the oldest fire station in the District. Station 31 serves some of the older neighborhoods in the District, consisting of small to medium size single family homes and numerous mobile home neighborhoods. There is a concentration of industrial type occupancies on the west side of 31's response area and two large propane distribution businesses. There are also several large apartment complexes and a four story hotel in the response area. Station 31 has the second highest call volume in the District, and is considered one of the three "core" stations.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and rank	9% 6th/10 stations
	Assigned Apparatus	<ul style="list-style-type: none"> • Engine 331 • Ladder 331 • Rescue 331
	Square Footage, Design, and Construction	7,701 sq. ft. The building is designed as a "heavy" three bay station and is primarily of masonry construction and classified as a Type III structure.
	Code Compliance and Safety	The station meets all current building and fire codes and is fully sprinklered. The parking area is accessible by access-controlled gates and entry into the building is by push button code system. Turnouts are stored in the apparatus bay.
	Staff Facilities	The station currently houses eight personnel including two Southwest Ambulance personnel. The station has sleeping quarters and living space for 10 personnel.
	Efficiency and Facility Condition	The station currently meets needs, however if there is another company assigned on a full shift basis, there may be a need to relocate a unit. The general condition of the facility is fair; a light remodel is planned in the next couple of years. The paved areas are in need of sealcoating.

Figure 4.3


Station 32 - 4151 W. Camino del Cerro		
	<p>Station 32 was rebuilt on-site in 2011. Station 32 primarily serves a residential community on larger sized lots. There are a few conventional style subdivisions as well as several unique occupancies that include the International Wildlife Museum and a large behavioral and drug addiction treatment center. There are several popular hiking and biking trails in 32's area as well as some of the District's wildland/urban interface. Station 32's area is susceptible to temporary road closures after heavy rains. Water supply can be a challenge in some of this station's area due widely spaced hydrants and steep and narrow driveways. There is a large multi-user communication tower on site.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and rank	5% 9th/10 stations
	Assigned Apparatus	<ul style="list-style-type: none"> • Engine 332 • Brush 332
	Square Footage, Design, and Construction	8,000 sq. ft. The building is designed as a "medium" two-bay station and is primarily of masonry construction and classified as a Type III structure. The roof is flat with a built up roof.
	Code Compliance and Safety	The station meets all current building and fire codes and is fully sprinklered. The parking area is accessible by access-controlled gates and entry into the building is by push button code system. Apparatus access on to Camino del Cerro is assisted by an Opticom device on the apparatus that activates a flashing warning sign in both directions.
	Staff Facilities	The station currently houses four personnel. The station has sleeping quarters and living space for six personnel.
	Efficiency and Facility Condition	The station currently meets needs all associated needs. The general condition of the facility is excellent. The paved areas are in need of sealcoating.

Figure 4.4


Station 33 - 2821 W. Ina Road		
	<p>Station 33 was relocated in 2009 to provide better response times for its first-due area. The station is one of two Special Operations stations and serves an area consisting of a mix of commercial and residential occupancies. There are several large apartment complexes in Station 33's area and several extended care facilities. This station has the third highest call volume in the District and is considered one of the District's "core" stations. It also houses the EMS captain/incident safety officer (EC331).</p>	
	<p>Percentage of NWFD total property cash value protected by station's first-due area, and rank</p>	<p>12% 4th/10 stations</p>
<p>Assigned Apparatus</p>	<ul style="list-style-type: none"> • Engine 333 • Rescue 333 • Engine 342 (Peak Activity Unit) • Light Squad 333 • Hazmat 333 • EC331 	
<p>Square Footage, Design, and Construction</p>	<p>14,000 sq. ft. The building is designed as a "heavy" three-bay station and is primarily masonry construction and classified as a Type III structure. The roof is flat with a built up roof.</p>	
<p>Code Compliance and Safety</p>	<p>The station meets all current building and fire codes and is fully sprinklered. The employee parking area is by access-controlled gates and entry into the building is by push button code system. Exiting apparatus can control the adjacent Ina/Shannon intersection by an Opticom device.</p>	
<p>Staff Facilities</p>	<p>The station currently houses 10 personnel that includes EN342 personnel Tuesday through Friday 0800-1800 hrs. The station has sleeping quarters and living space for 13 personnel.</p>	
<p>Efficiency and Facility Condition</p>	<p>The station currently meets needs all associated needs. The general condition of the facility is good. The paved areas are in need of sealcoating.</p>	

Figure 4.5


Station 34 – 8165 N. Wade Road – Continental Ranch Station		
	<p>Station 34 was constructed in 1993 and underwent a substantial remodel in 2004. It serves one of the more rapidly growing areas of the district and has the most diverse first-due area in terms of occupancies and other response aspects. Station 34's response area includes a large retirement community, light industry, many single family residence subdivisions, remote large single family residences, and several miles of Interstate 10. Some of the major roadways in south half of the first-due are susceptible to flooding during heavy rains. Station 34 is one of the District's two Special Operations stations. There are several TRT training props that are located at this station.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and rank	16% 1st/10 stations
Assigned Apparatus	<ul style="list-style-type: none"> • Engine 334 • Rescue 334 • Squad 334 	
Square Footage, Design, and Construction	7,323 sq. ft. The building is designed as a "medium" two-bay station and is primarily of masonry construction and classified as a Type III structure. The roof is of a built up flat design.	
Code Compliance and Safety	The station meets all current building and fire codes and is fully sprinklered. The employee parking area is accessible by access-controlled gates and entry into the building is by push button code system.	
Staff Facilities	The station currently houses six personnel. The station has sleeping quarters and living space for seven personnel.	
Efficiency and Facility Condition	The station currently meets needs all associated needs. The general condition of the facility is good.	

Figure 4.6


Station 35 – 3220 N. Camino de Oeste – Tucson Mountains Station		
	<p>Station 35 was constructed in 2006 as part of a residential house conversion. It serves a primarily rural/suburban area dominated by medium to very large single family residential occupancies. There are numerous hiking and biking trails on the west side of Station 35's first-due area. Virtually all of the primary roadways in Station 35's area are susceptible to flooding during heavy rains that can create substantial response challenges during these conditions. In addition, steep, winding driveways in the foothills area can also create access challenges to some of the larger residential occupancies.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and rank	7% 7 th /10 stations
	Assigned Apparatus	<ul style="list-style-type: none"> • Engine 335 • Tender 335
	Square Footage, Design, and Construction	7,552 sq. ft. The building is designed as a "medium" two-bay station and is primarily of masonry construction and classified as a Type III structure. The roof is of a built up flat design.
	Code Compliance and Safety	The station meets all current building and fire codes and is fully sprinklered. Employee parking is not access controlled and entry into the building is by a conventional lock system.
	Staff Facilities	The station currently houses four personnel. The station has sleeping quarters and living space for six personnel.
	Efficiency and Facility Condition	The station currently meets needs all associated needs. The general condition of the facility is good. The paved areas are need of sealcoating.



Figure 4.7


Station 36 – 13475 N. Marana Main Street		
	<p>Station 36 was constructed in 2006. The station was designed with a large capacity in anticipation of substantial growth expected in the first-due area. Station 36 serves a primarily suburban and rural area, with several miles of I-10 traversing through the first-due. It also serves the only airport in the District, Marana Regional Airport. There are rapidly developing subdivisions in the eastern and southern areas of Station 36's first-due.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and rank	6% 8 th /10 stations
Assigned Apparatus	<ul style="list-style-type: none"> • Engine 336 • Tender 336 • ARFF 336 • MMRS 336 	
Square Footage, Design, and Construction	<p>13,534 sq. ft. The building is designed as a "heavy" four-bay station and is primarily of masonry construction and classified as a Type III structure. The roof is of a built up flat/sloped design.</p>	
Code Compliance and Safety	<p>The station meets all current building and fire codes and is fully sprinklered. The employee parking area is accessible by access-controlled gates and entry into the building is by push button code system.</p>	
Staff Facilities	<p>The station currently houses four personnel. The station has sleeping quarters and living space for 12 personnel.</p>	
Efficiency and Facility Condition	<p>The station currently meets needs all associated needs. The general condition of the facility is good. The paved areas need sealcoating.</p>	

Figure 4.8


Station 37 – 13001 N. Tortolita Road – Dove Mountain Station		
	<p>Station 37 was constructed in 1997 and serves the District's fastest growing area. Station 37 primarily serves medium to very large single family residences, and has a large retirement population that peaks during the winter season. Access to some large residences in the steeper sloped areas can be a challenge for full size apparatus. The station's first-due has an extensive network of hiking and biking trails, many of which originate from the Ritz-Carlton Resort area, an area that currently represents a response time challenge for the District. A large, multi-user communication tower is located on the site.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and rank	11% 5 th /10 stations
	Assigned Apparatus	<ul style="list-style-type: none"> • Engine 337 • Brush 337
	Square Footage, Design, and Construction	8,910 sq. ft. The building is designed as a "medium" two-bay station and is primarily of masonry construction and classified as a Type III structure. The roof is mostly of a pitched design with a metal finish.
	Code Compliance and Safety	The station meets all current building and fire codes and is fully sprinklered. The employee parking area does not have access-controlled gates and entry into the building is by push button code system.
	Staff Facilities	The station currently houses four personnel. The station has sleeping quarters and living space for five personnel.
	Efficiency and Facility Condition	The station currently meets needs all associated needs. The general condition is fair, the station is scheduled to be relocated in 2018. The paved area is in need of sealcoating.

Figure 4.9


Station 38 – 8475 N. Star Grass Way		
	<p>Station 38 was constructed in 2007 and serves a wide array of occupancies including small to medium single family residences, large apartment complexes and medium to large retail occupancies. Station 38's first-due also includes the District's largest shopping mall and the District's only high school. The area is seeing substantial growth in northwest area of its first-due, which is presenting a challenge meeting current response time standards. Station 38 also serves as home for Battalion 332 (separate living quarters/bedroom) and is the District's only two-story station.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and rank	13% 3 rd /10 stations
	Assigned Apparatus	<ul style="list-style-type: none"> • Engine 338 • Ladder 338 • Rescue 338 • BC332
	Square Footage, Design, and Construction	14,160 sq. ft. The building is designed as a "heavy" three-bay station and is primarily of masonry construction and classified as a Type III structure. The roof is of a built up flat design.
	Code Compliance and Safety	The station meets all current building and fire codes and is fully sprinklered. The employee parking area is accessible by access-controlled gates and entry into the building is by push button code system.
	Staff Facilities	The station currently houses 8 personnel including two Southwest Ambulance personnel. The station has sleeping quarters and living space for 9 personnel.
	Efficiency and Facility Condition	The station currently meets needs all associated needs. The general condition of the facility is good. The paved areas are in need of sealcoating.

Figure 4.10



Station 39 – 12095 N. Thornydale Road – Villagio Station		
	<p>Station 39 was constructed in 2010. It currently has the lowest call volume of all NWFD stations but is in a rapidly growing area of the District. Station 39 primarily serves medium to very large SFR's, with a small amount of office and retail occupancies. Building construction in station 39's first-due area is relatively new, with most structures less than 15 years old. Station 39's response area includes some of the longest travel times in the District, exceeding ten minutes near the northern end of its response zone.</p>	
	Percentage of NWFD total property cash value protected by station's first-due area, and rank	5% 10 th /10 stations
	Assigned Apparatus	<ul style="list-style-type: none"> • Engine 339 • Rehab 339
	Square Footage, Design, and Construction	8,673 sq. ft. The building is designed as a "medium" two-bay station and is primarily of masonry construction and classified as a Type III structure. The roof is mostly of a pitched design with tile shingles.
	Code Compliance and Safety	The station meets all current building and fire codes and is fully sprinklered. The employee parking area is accessible by access-controlled gates and entry into the building is by push button code system.
	Staff Facilities	The station currently houses four personnel. The station has sleeping quarters and living space for seven personnel.
	Efficiency and Facility Condition	The station currently meets needs all associated needs. The facility is in excellent condition. The paved areas are in need of sealcoating.

Figure 4.11

Training Center – 5125 W. Camino de Fuego	
	<p>The Training Center site consists of 12.5 acres and was dedicated in 2012. Training amenities on site include:</p> <ul style="list-style-type: none"> • Administrative offices for the training staff. • Three formal classrooms with capacities of 32 students each and three informal, “dirty” classrooms designed for hands-on training. • A Command Center classroom that is designed for computer based simulations. • Five-story drill tower that is equipped with smoke generators and can be utilized for fire and technical rescue related drills. • Two-story Class A burn building with burn rooms on the first and second floors. • Hazmat props including two full-size RR tank cars and two over-the-road tankers. • Residential and commercial ventilation props. • Car fire prop. • Pump test pit. • Candidate Physical Ability Test course.
	<p>Square footage, Design and Construction</p> <p>Classrooms are reinforced concrete masonry and mortar construction. Roofs are of built-up flat type construction. The drill tower is structural steel construction and the burn building is reinforced concrete with thermal paneling in the burn rooms. Construction type varies; classrooms are Type III, training tower is Type II, and the burn building is Type I.</p>
	<p>Code Compliance and Safety</p> <p>The buildings meet all current building and fire codes. Occupied structures are fully sprinklered. The drill ground area is separated by a limited access gate.</p>
	<p>Staff Facilities</p> <p>Staff facilities are adequate for the current level of training staff. Training staff is nearing capacity and further increases will likely require a remodel effort in Building A.</p>
	<p>Efficiency and Facility Condition</p> <p>The buildings are excellent condition. However, there is a substantial area of the paved areas that is in need of major repair.</p>

Figure 4.12

Administration and Prevention & Safety - 5225 W. Massingale Road	
	<p>The Administration Building was originally built in 1984 and was acquired by NWFD in 2003. The Fire Chief, two Assistant Fire Chiefs and their administrative staff have offices at this facility. It also houses Prevention and Safety, Finance, Procurement, and the Public Information Officer. Human Resources is located in a double wide trailer (20' x 60') adjacent to the facility.</p>
	<p>Square Footage, Design, and Construction</p> <p>7,200 sq. ft. The building is mostly slump block and mortar construction, with a roof that is flat. It is classified as a Type III structure.</p>
	<p>Code Compliance and Safety</p> <p>The building meets all current building and fire codes at the time of construction. The facility is not sprinklered but has a monitored fire alarm system. It has public parking in the front with employee parking in the rear with an automatic gate with keypad for security. Parking space is limited, but adequate for current usage.</p>
	<p>Staff Facilities</p> <p>There are 15 rooms suitable for office space for the administrative personnel. The building has 1 large conference room, a small conference room and a kitchen. There is a large room with 7 cubicle spaces. There are additional rooms that are used for storage. There is a small room that houses a significant amount of critical IT hardware and software.</p>
	<p>Efficiency and Facility Condition</p> <p>The building is approximately 35 years old, and in fair condition. This facility had a major renovation completed in 2015. The paved areas are in need of sealcoating.</p>

**Figure 4.13**


Operations Headquarters - 4701 N. La Cholla	
	<p>The Operations HQ building houses the OPS deputy chief, scheduling captain, Health/Safety & Special Projects division chief and Health/Safety deputy chief. In addition, it also serves as the BC331 quarters and Community Assistance Program members also utilize the building for office space. The building has a conference room and shares a back-up generator with Station 31. There is a helicopter landing pad SW of the building.</p>
	<p>Square Footage, Design, and Construction</p> <p>4,320 sq. ft. The building is reinforced masonry construction and classified as a Type III structure. The structure has a pitched metal roof.</p>
	<p>Code Compliance and Safety</p> <p>The station meets all current building and fire codes at the time of construction. It is fully sprinklered. The parking area is unsecured and entry into the building is by push button code system.</p>
	<p>Staff Facilities</p> <p>The facility can provide office space for up to six staff. It houses the sleeping quarters and living space for the battalion chief.</p>
	<p>Efficiency and Facility Condition</p> <p>The station currently meets all associated needs. The facility is in good condition. Future development on District owned land to the west is prohibited by archeological features. The paved area needs sealcoating.</p>

Figure 4.14


EMS Administrative Offices - 8165 N. Wade Road	
	The EMS administrative offices facility was constructed in 1993 and was originally the District's Training Division office and classroom. The Emergency Medical Services administrative and training staff are located at this facility, which is just west of Station 34. There are six staff offices and a conference room at this facility.
	Square Footage, Design, and Construction
	3500 sq.ft. The building is of slump block and mortar construction, with a flat roof. It is classified as a Type III structure.
	Code Compliance and Safety
	The building meets all current building and fire codes at the time of construction. The facility is fully sprinklered. It has unsecured public and employee parking just to the west of the facility. Parking is limited, but adequate for current usage.
Staff Facilities	There are 7 rooms suitable for office space for the administrative personnel. The building has 1 large conference room and a kitchenette area. There are additional rooms that are used for storage. There is a small room that houses a significant amount of IT hardware and software.
	Efficiency and General Facility Condition
	The building is approximately 25 years old, and in good condition. This facility underwent a major renovation in 2015.

Figure 4.15


Fleet Services – 7375 N. Star Commerce Way	
	<p>The Fleet Services building was constructed in 2004 and consists of administrative and parts warehouse space as well as three service bays. There is also a welding operations designated area.</p>
	<p>Square Footage, Design, and Construction</p> <p>14,900 sq. ft. The building is of a pre-fabricated, metal frame design and is classified as a Type V structure. The structure has a pitched metal roof.</p>
	<p>Code Compliance and Safety</p> <p>The station met all current building and fire codes at the time of construction. It is fully sprinklered. The parking area is secured during non-business hours.</p>
	<p>Staff Facilities</p> <p>There is cubicle or individual office space for seven staff members. The space is currently adequate for staff needs.</p>
	<p>Efficiency and Facility Condition</p> <p>The station currently meets all associated needs. The facility is in good condition. There is room to add service bays if needed in the future.</p>

Figure 4.16



Logistics/ IT - 1520 West Orange Grove Road	
	<p>This facility was formerly Station 30, but was renovated into the Logistics/Warehouse facility in 2012. It is located adjacent to the new Station 30. The Logistics Deputy Chief, Facilities Coordinator, Warehouse Supervisor, two Couriers, and two IT personnel all are housed in this building. The old engine bays were reconfigured and now serve as a warehouse area. A large multi-user communication tower is located on the site.</p>
	<p>Square Footage, Design, and Construction</p> <p>9,539 sq. ft. The building is mostly slump block and mortar construction, although there is a small portion that is of frame construction. The roof is flat. It is classified as a Type III structure.</p>
	<p>Code Compliance and Safety</p> <p>The building meets all current building and fire codes at the time of construction. It is fully sprinklered. There is a small parking lot in the front of the building that is available to the public. The main employee parking is in a locked/gated area behind the facility. Parking is limited, but adequate for current usage.</p>
	<p>Staff Facilities</p> <p>There are seven rooms suitable for office space for the Logistics personnel, and a large work area with two office spaces for the IT personnel. There are additional rooms that are used for storage. Additionally, the old engine bays are used as a warehouse. There is a small room that houses a significant amount of critical IT hardware and software.</p>
	<p>Efficiency and Facility Condition</p> <p>The building is in good condition except for the roof over the warehouse which will need major repairs in the near future. The paved areas are in need of sealcoating.</p>

Figure 4.17

Equipment Services Center – 3701 W. Quasar	
	<p>This facility was originally built in 1993 and served as the location for Station 33 and the Wildland Operations Center. In 2016 the facility was converted to serve as the Equipment Services Center. It houses one full-time and one part-time PPE technician. It is the only facility that is not located within the Northwest Fire District.</p>
	<p>Square Footage, Design, and Construction</p> <p>6,182 sq. ft. The building is mostly slump block and mortar construction, the roof is of a built up flat construction type. It is classified as a Type III structure.</p>
	<p>Code Compliance and Safety</p> <p>The building met all current building and fire codes at the time of construction. It is fully sprinklered. Parking space is adequate for current usage but is not secured.</p>
	<p>Staff Facilities</p> <p>There is adequate office and work space for the current workload with room for expansion of staff and work in the future.</p>
	<p>Efficiency and Facility Condition</p> <p>The building is in fair condition with several major repairs and parking lot work needed in the near future. The building is well laid out for its new purpose. The paved areas are in need of sealcoating.</p>



Mobile Assets (Apparatus)

NWFD maintains a diverse fleet of apparatus equipped to handle the all-hazard approach to its mission. The various types of apparatus that NWFD deploys on emergencies, listed by their dispatch designator type, are described below.

Engine – Primary response unit from each station for most types of service requests. Each engine is equipped with a 1250 gpm pump, 500-gallon water tank, a Class A foam system, set of hydraulic power rescue tools and compliment set of equipment in accordance with NFPA 1901, Standard for Automotive Fire Apparatus, 2016 edition. All NWFD engines meet the requirements for FEMA Type 1 engine classification.

Ladder – Apparatus equipped with a minimum of 100' fixed aerial ladder or platform, an assortment of ground ladders, fixed and portable lighting, various power tools and salvage equipment, as in accordance with NFPA 1901, Chapter 6. NWFD ladder apparatus are designed as quints²² and are equipped with a 2000 gpm pump, 300-gallon water tank and a minimum of 300 feet of large diameter supply hose. All NWFD ladders meet the requirements for FEMA Type 1 ladder classification.

Rescue – More commonly known as ambulances, these vehicles can provide medical services on incidents and patient transport. All NWFD rescues/ambulances meet the requirements for GSA Type 1 ambulance classification.

Tender – Vehicle designed to carry large quantities of water (2500 gallons or more) to deliver water for firefighting efforts in remote areas that are not serviced by fire hydrants. All NWFD tenders meet the requirements for FEMA 508-4 Type 1 and NWCG S2 classification.

Brush – Small or medium sized apparatus specifically designed for wildland firefighting. They are all-wheel drive and carry from 300 to 500 gallons of water. They are in compliance with applicable sections of NFPA 1906, Wildland Fire Apparatus and are equipped in accordance with National Wildland Coordinating Group requirements.

Incident Command/Hazmat – Specialized apparatus that carries a large inventory of hazmat response specific equipment. It is also capable of being an incident command post with associated communication equipment and work space.

Squad – Specialized apparatus that carries both a large inventory of technical rescue and hazmat equipment. This apparatus is designed to operate at a large incident for an extended period with minimal support.

²² A quint is a fire apparatus with a fire pump, water tank, hose storage area, have a permanently mounted waterway and complement of ground ladders (NFPA 1710 definition).

Rehab – Vehicle designed for rehabilitation services for firefighters at an incident. It provides seating in a temperature controlled environment and carries a variety of rehab equipment and supplies as well as a restroom.

MMRS – Vehicle that supports mass casualty incidents that is stocked with a variety of medical equipment and supplies. It also carries a large portable shelter designed to be used for patient treatment or firefighter rehab.

Equipment - A support vehicle that responds to all working fires and other large incidents to provide breathing air for self-contained breathing apparatus (SCBA's), scene lighting, salvage support and light rehab services.

ARFF – Apparatus specifically designed to fight aircraft fires. NWFD's ARFF unit is a FAA Class 1 vehicle designed to provide quick fire attack for small aircraft.

A summary of NWFD apparatus and associated distribution and staffing is listed in Figure 4.18.



Rescue, engine and 100' ladder/platform apparatus.



Figure 4.18
Emergency Services and Associated Resources and Staffing

Service	Resources	Staffing
Fire Suppression	10 staffed engine companies 2 cross-staffed ladder companies 5 staffed rescue companies 2 tenders 1 air-light (equipment) truck 1 rehab truck	24/7 staffing 4 per engine/ladder co 2 per rescue co 1 EMS/ISO captain 2 battalion chiefs 1 on-call deputy chief Total of 54 constant staffing 40-hour staffing 1 staffed engine co (Tues-Fri) 2 chief officers (M-F)
Emergency Medical Services	10 staffed engine companies 2 cross-staffed ladder companies 5 staffed rescue companies 1 mass causality truck Each company staffed with minimum of one paramedic.	24/7 staffing 4 per engine/ladder co 2 per rescue co 2 battalion chiefs Total of 54 constant staffing 40-hour staffing 1 staffed engine co (Tues-Fri) 1 EMS chief officer (M-F) 1 EMS captain (M-F) 2 EMS paramedic coordinators (M-F)
Hazardous Materials	1 IC/hazmat apparatus (Station 33) 1 hazmat/TRT apparatus (Station 34)	24/7 staffing 8 hazmat technicians and/or specialists at stations 33 and 34.
Technical Rescue	1 light squad apparatus (Station 33) 1 hazmat/TRT apparatus (heavy rescue, station 34) 1 Gator ATV	24/7 staffing 8 technical rescue technicians at stations 33 and 34.
Wildland	2 Type 3 brush apparatus 1 Type 6 brush apparatus 1 Gator ATV	24/7 staffing Staffing as listed under Fire Suppression



Figure 4.19
Mobile Asset Locations and Associated Staffing

Station	Unit designation	Description	Staffed		Personnel
			yes	no	
30	EN330	2010 KME 1250 gpm pumper	x		4
	RT330	2009 Chevrolet/AEV ambulance	x		2
31	EN331	2010 KME 1250 gpm pumper	x		4
	LD331	1999 Spartan/Smeal 100' platform	Crew toggles b/w engine		
	RT331	2016 Dodge/Braun NW ambulance	x		2
32	EN332	2010 KME 1250 gpm pumper	x		4
	BR332	2007 Pride Enterprises Type 6 4x4 brush truck		x	--
33	EN333	2008 Pierce Arrow 1250 gpm pumper	x		4
	EN342	2016 KME 1250 gpm pumper	x ²³		4
	RT333	2015 Dodge/Braun NW ambulance	x		2
	HZ333	2004 Spartan/SVI incident command/hazmat truck		x	--
	LTSQ333	2002 Ford F550 utility box + ATV trailer		x	--
34	EN334	2005 Pierce Enforcer 1250 gpm pumper	x		4
	RT334	2015 Dodge/Braun NW ambulance	x		2
	SQ334	2009 Spartan/SVI heavy rescue/hazmat vehicle		x	--
35	EN335	2005 Pierce Enforcer 1250 gpm pumper	x		4
	TN335	1997 Semo 2775 gallon tender		x	--
	BR335	2008 International/Placer Type 3 4x4 brush truck		x	--
	EQ335	1997 International/SVI air/light/salvage truck		x	--
36	EN336	2006 Pierce Enforcer 1250 gpm pumper	x		4
	TN336	2008 International/US Tanker 2700 gallon Type 1 tender		x	--
	AR336	2005 Ford F550 FAA ARFF vehicle		x	--
	MMRS336	2008 International box-style mass causality incident truck		x	--
37	EN337	2005 Pierce Enforcer 1250 gpm pumper	x		4
	BR337	2008 International/Placer Type 3 4x4 brush truck		x	--
38	EN338	2008 Pierce Arrow 1250 gpm pumper	x		4
	LD338	2005 Smeal 105' aerial ladder	Crew toggles b/w engine		
	RT338	2016 Dodge/Braun NW ambulance	x		2
39	EN339	2010 KME 1250 gpm pumper	x		4
	RH339	2005 Chevrolet Supreme/Senator Bus rehab vehicle		x	--

²³ EN342 is staffed Tuesday-Friday, 0800-1800 hrs.

Automatic and Mutual Aid

While NWFD has a strong response network that includes stations, apparatus, and personnel, the District recognizes the necessity of maintaining automatic and mutual aid agreements²⁴ with other regional fire agencies. Figure 4.20 represents auto and mutual aid given/received during 2015. Figure 4.21 shows NWFD's automatic and mutual aid partners.

Figure 4.20
Auto and Mutual Aid Given/Received

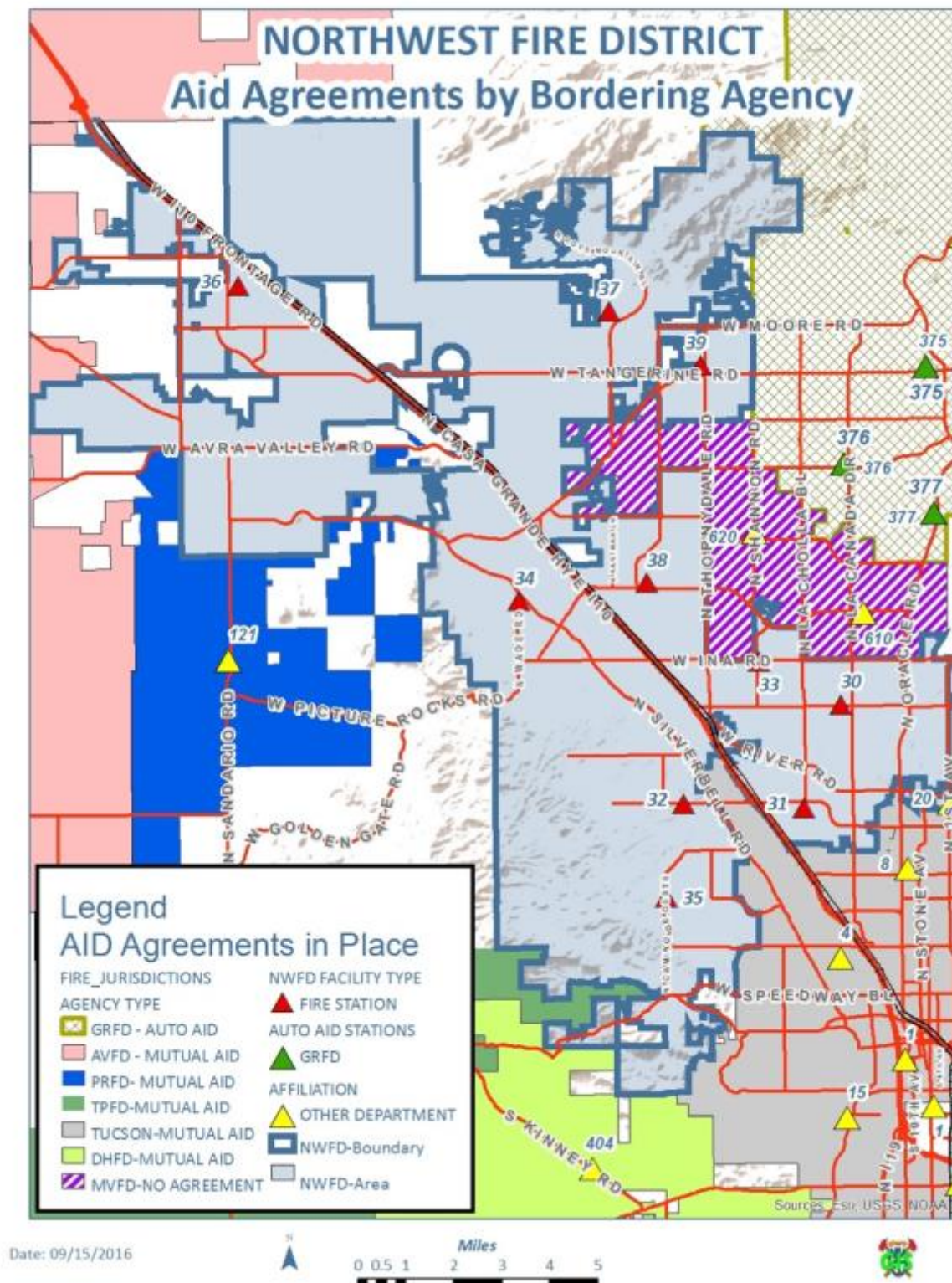
Year	Auto Aid		Mutual Aid	
	Given	Received	Given	Received
2015	128	157	230	27



Golder Ranch Fire District and Northwest Fire District share an automatic aid agreement. In addition to these two Districts dispatching the closest available unit without regard to GRFD/NWFD boundaries, standard operating guidelines and training activities are aligned whenever possible.

²⁴ Automatic aid is defined as a response agreement with another fire agency, where units are dispatched by the same dispatch center and dispatched on the initial alarm or dispatch, based on proximity to the emergency, without regard to agency boundaries. Mutual aid is defined as assistance that is requested by an agency from another; these units are not on the initial alarm or dispatch.

Figure 4.21

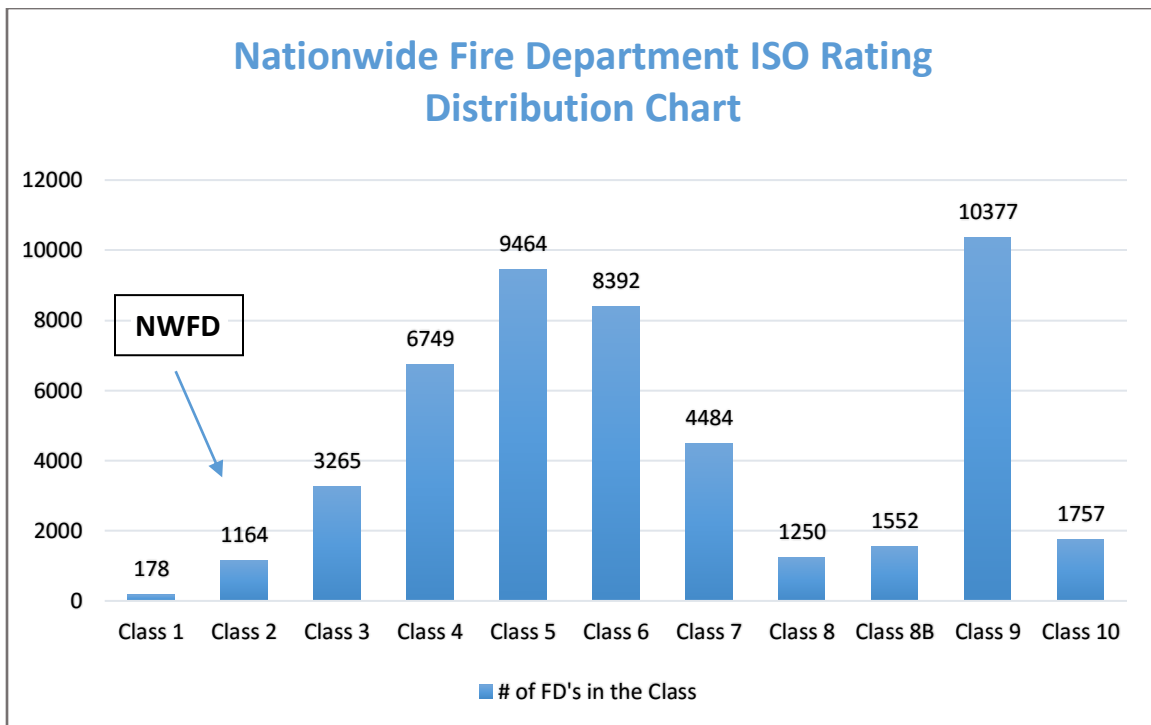


Performance

Insurance Services Office Rating

The Insurance Service Office (ISO) was developed to collect and evaluate data from fire service communities across the United States. ISO's Fire Suppression Rating Schedule (FSRS), evaluates four primary categories of fire suppression — emergency communications, fire department, water supply, and community risk reduction. The evaluation process produces a ranking structure that reflects the effectiveness of the fire department evaluated and current performance, specifically as it relates to fire prevention and fire suppression activities. The scale range is 1-10, with 1 being the best rating, and 10 being the lowest rating. NWFD currently has an ISO rating of 2/2Y, placing it in the top 3% of all ISO rated fire agencies in the country as demonstrated by Figure 4.22.

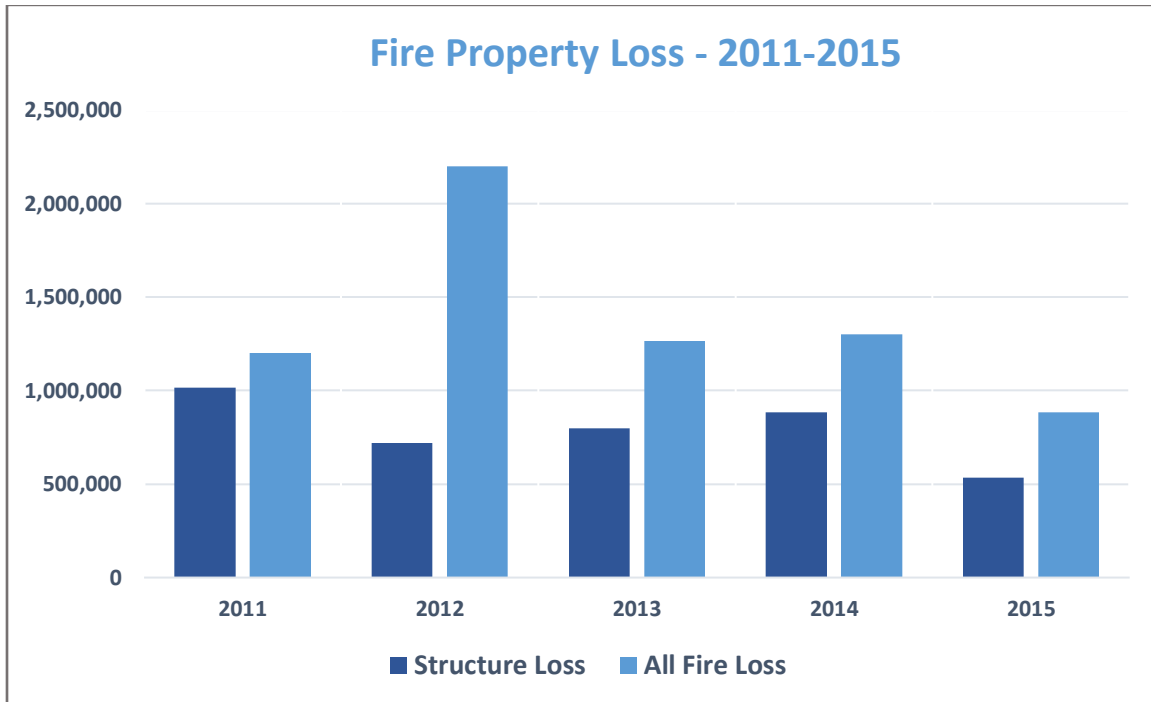
Figure 4.22



Fire Related Property Loss and Injuries/Fatalities

Performance can be measured in several ways. NWFD uses fire property and associated civilian injury and deaths as two of the performance dimensions as shown in Figure 4.23 and 4.24.

Figure 4.23



Structure fire property loss has generally been trending downward the past five years, with variability in the number of non-structure fire events. This is in line with the national trend which indicates that structure fires have decreased 16% in the past 20 years (source – NFPA).

Figure 4.24

Civilian Injuries and Deaths from All Fire Incident Types

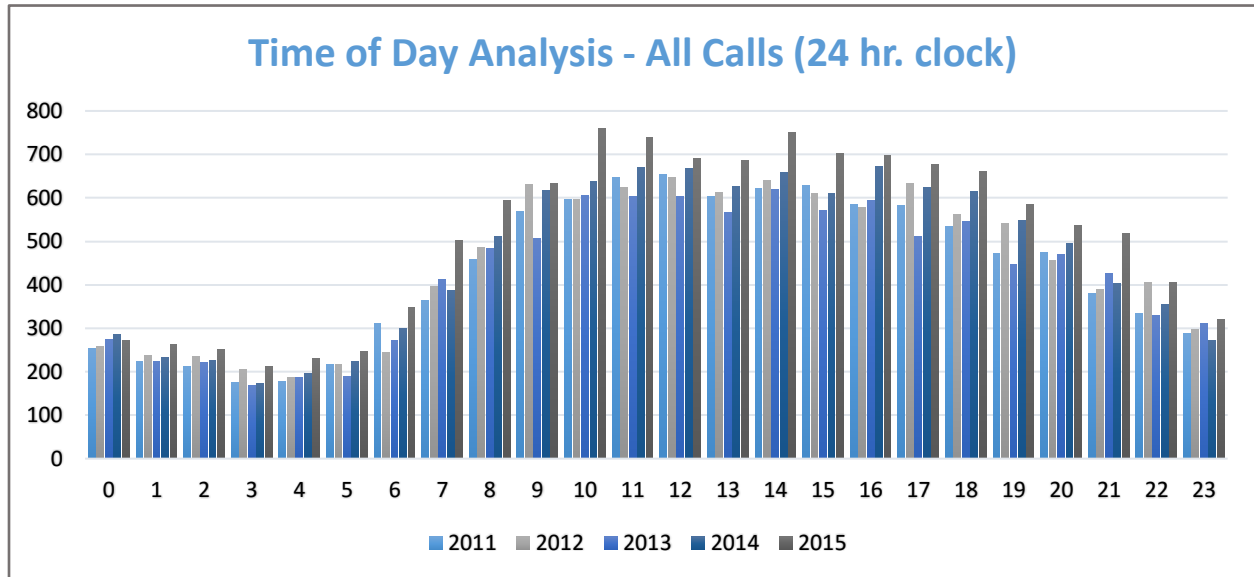
Year	Civilian Injuries	Civilian Deaths
2011	3	1
2012	2	0
2013	8	1
2014	7	1
2015	3	0
Total	23	3

As Figure 4.24 indicates, three civilians lost their lives due to fire during the period of 2011-2015.

Temporal Analysis

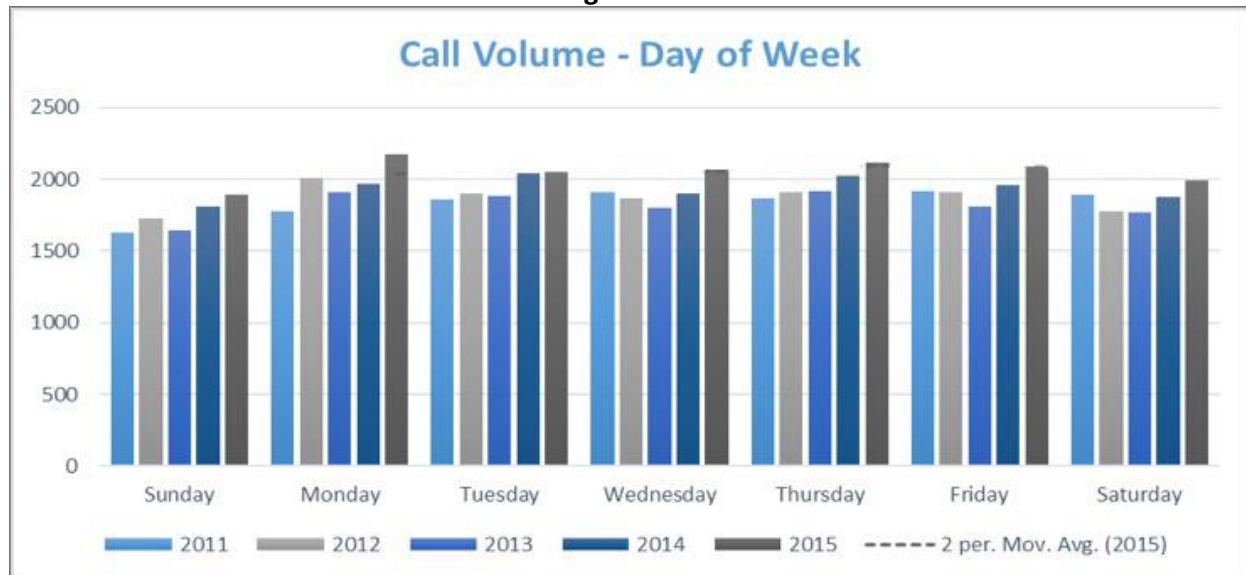
Reviewing the volume of incidents by differing time periods reveals when the greatest service demand is occurring. Figures 4.25-4.28 show the change in activity for NWFD based on various measures of time.

Figure 4.25



The time of day analysis revealed that the occurrences of calls is similar to the past two SOC analyses and is reflective of the national call time of day distribution. Call volume begins to pick up significantly after 0600 and begins a rapid drop-off after 2100 hours. A total of 76% of the calls occurred between 0800 and 2100 hours.

Figure 4.26



The day of the week analysis indicated that weekends had slightly lower call volume than the rest of the days of the week. Sundays represented the slowest day of the week at 13.0% of total call volume. Mondays and Thursdays were the busiest days of the week, each having 14.8% of the total call volume, or roughly 12% busier than Sunday.

Figure 4.27

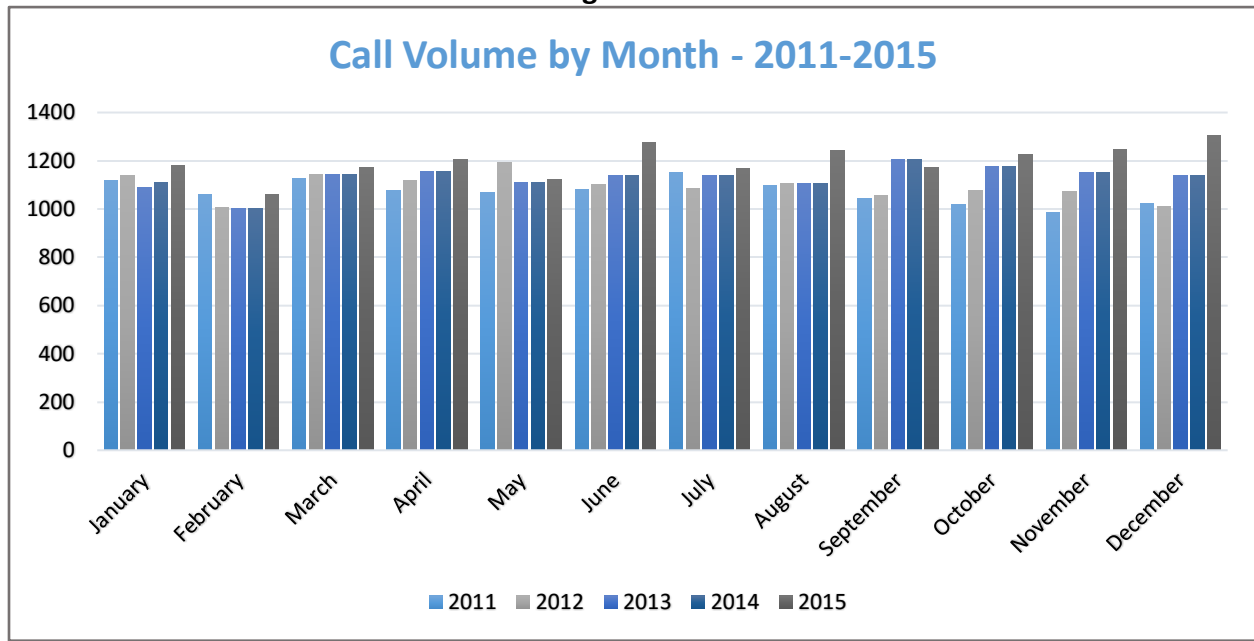
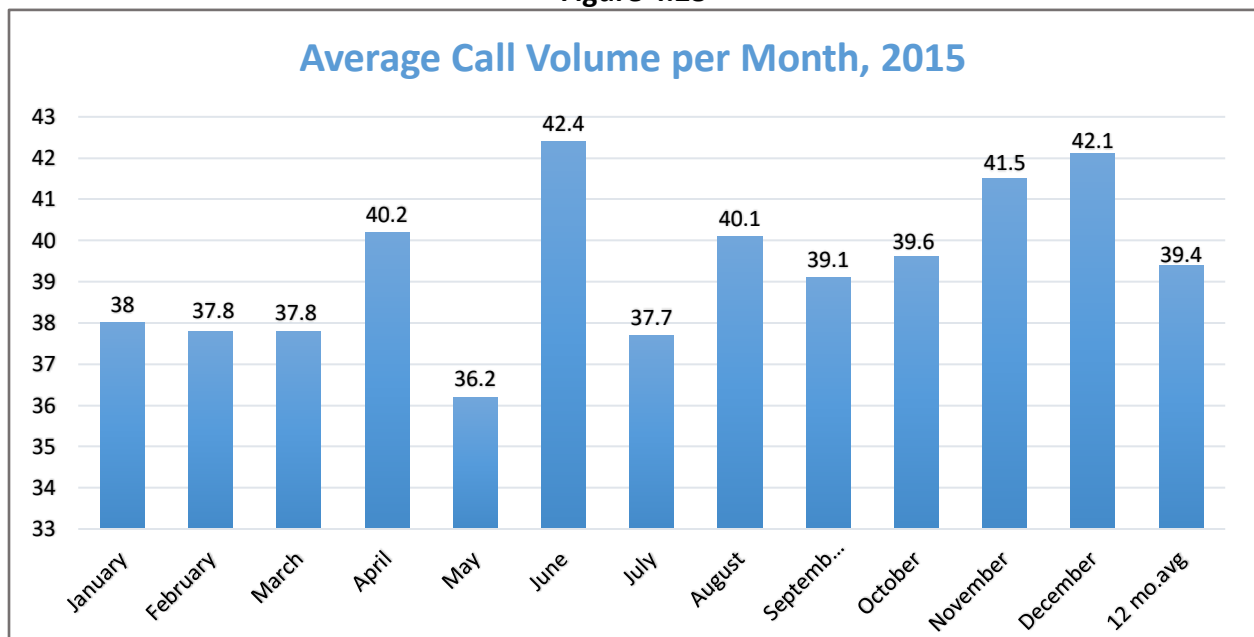


Figure 4.28



Call volume by month during the period of 2011-2015 showed minimal variance; November represented the slowest month at 8.2% total call volume, and March was the busiest at 8.6%. 2015 data show an average of 39.4 calls per day, with a peak of 42.4 calls per day in June.



Call Volume, Distribution, and Type (Includes Emergency and Non-Emergency Calls)

Figure 4.29

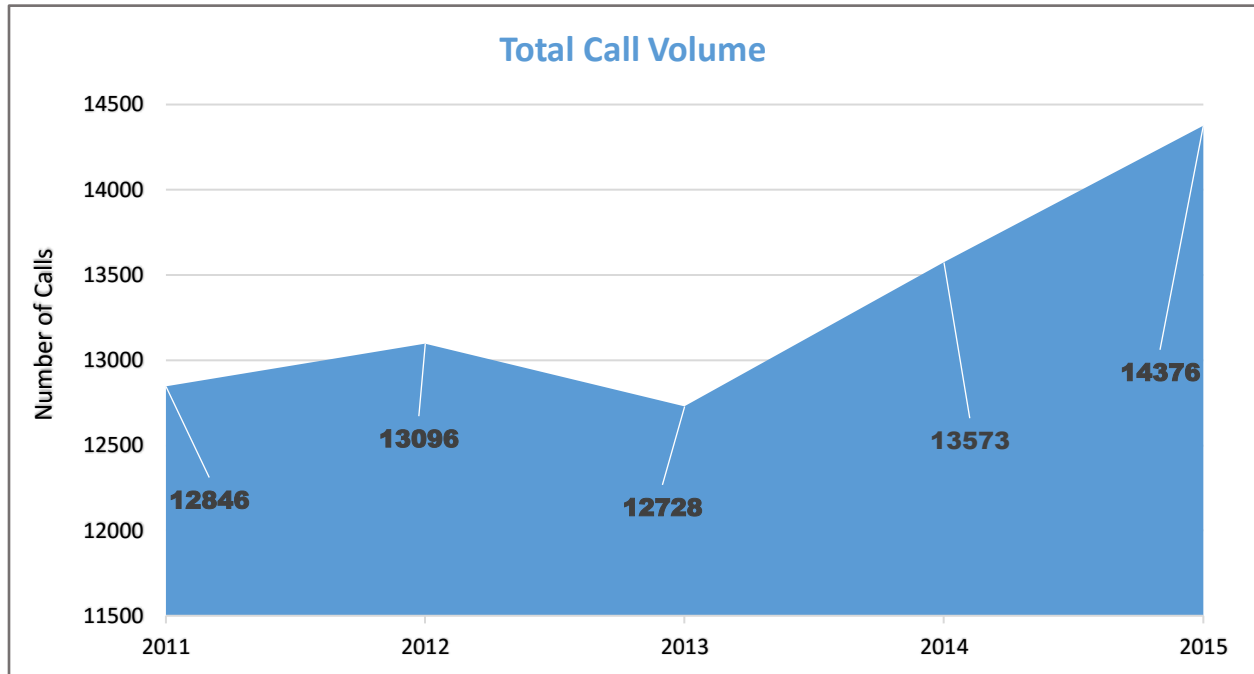


Figure 4.30

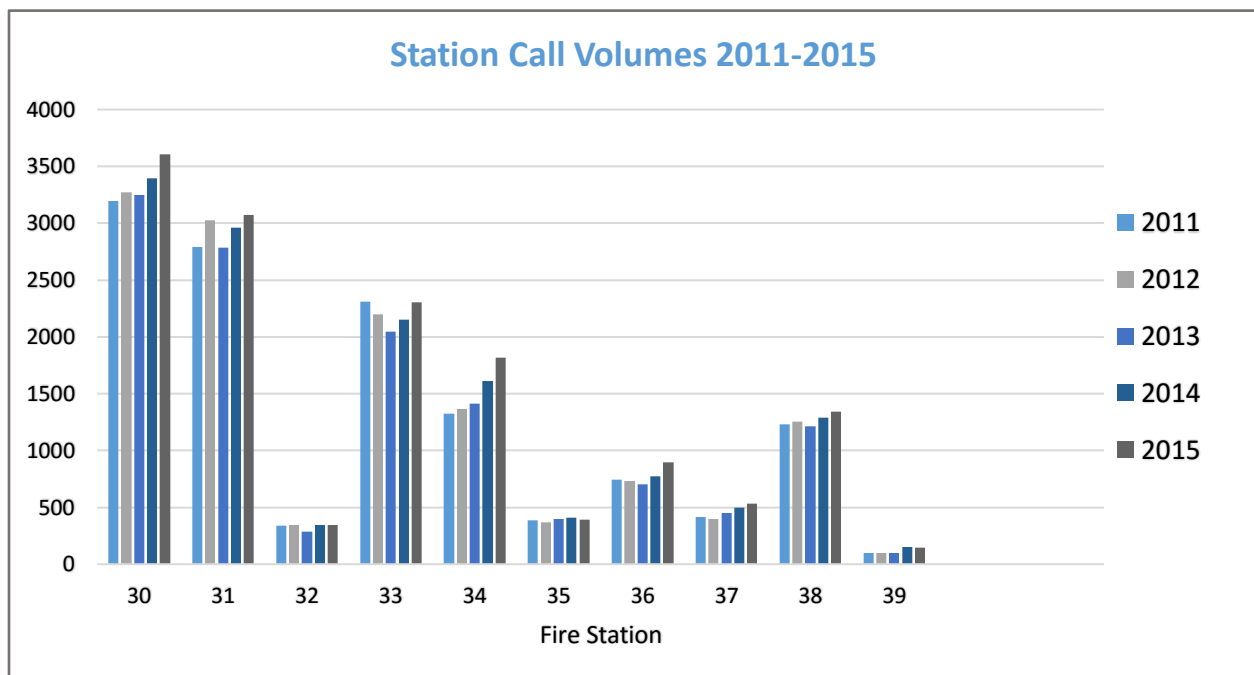




Figure 4.31

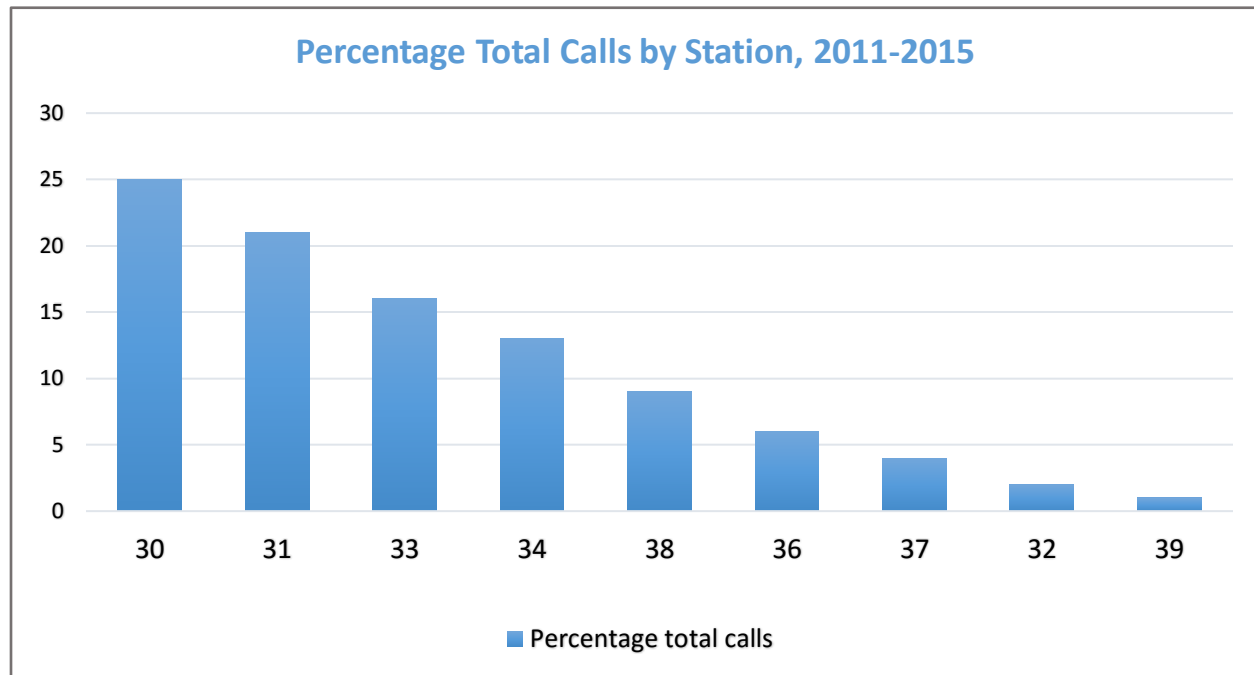
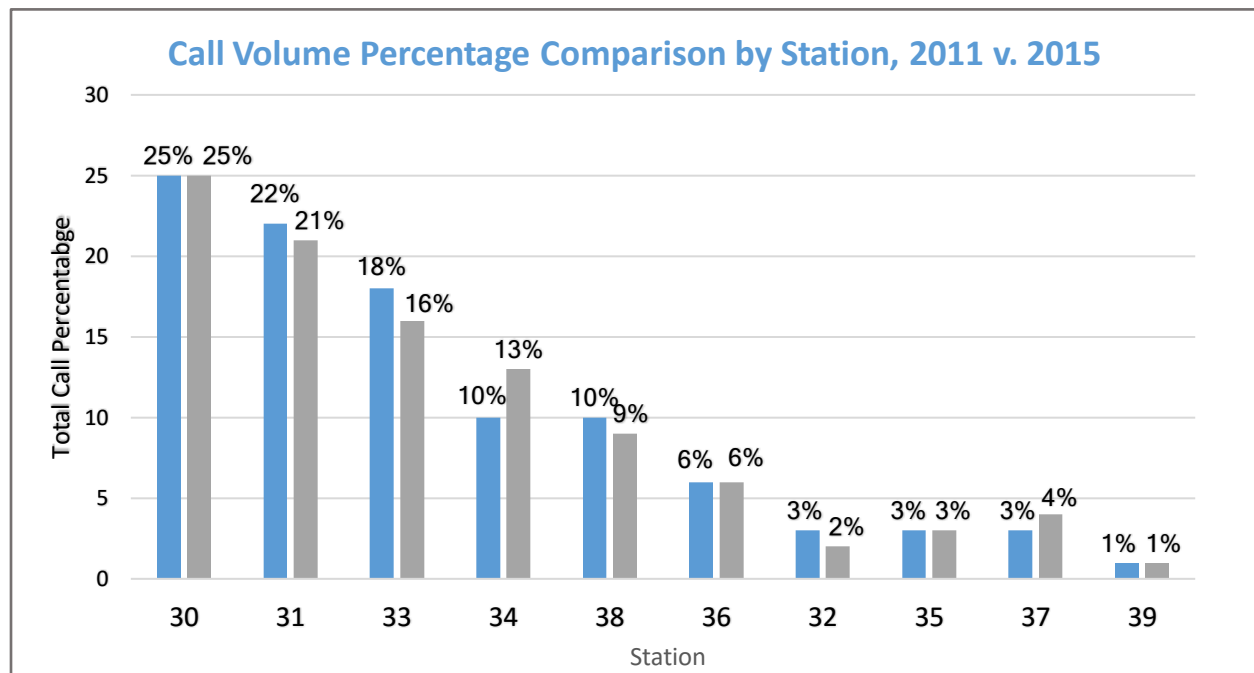


Figure 4.32



Call Volume Discussion

Analysis of the station call volume distribution shows that four stations run 75% of the District's calls, with Stations 30 and 31 running a combined total of 46% or nearly half of the total call volume. Four of the slowest stations run a combined total of 10% of the total call volume with the two remaining moderately busy stations combining for a total of 15% of the total call volume.

Perhaps the most important information gained from the data analysis is the total call volume. It rose nearly 12% from 2013 to 2015; a significant increase.

While Station 39 represented the greatest *percentage* gain in call volume for the period of 2011-2015, Station 34 had the greatest gain in *actual* calls for the same time period.

Figure 4.33

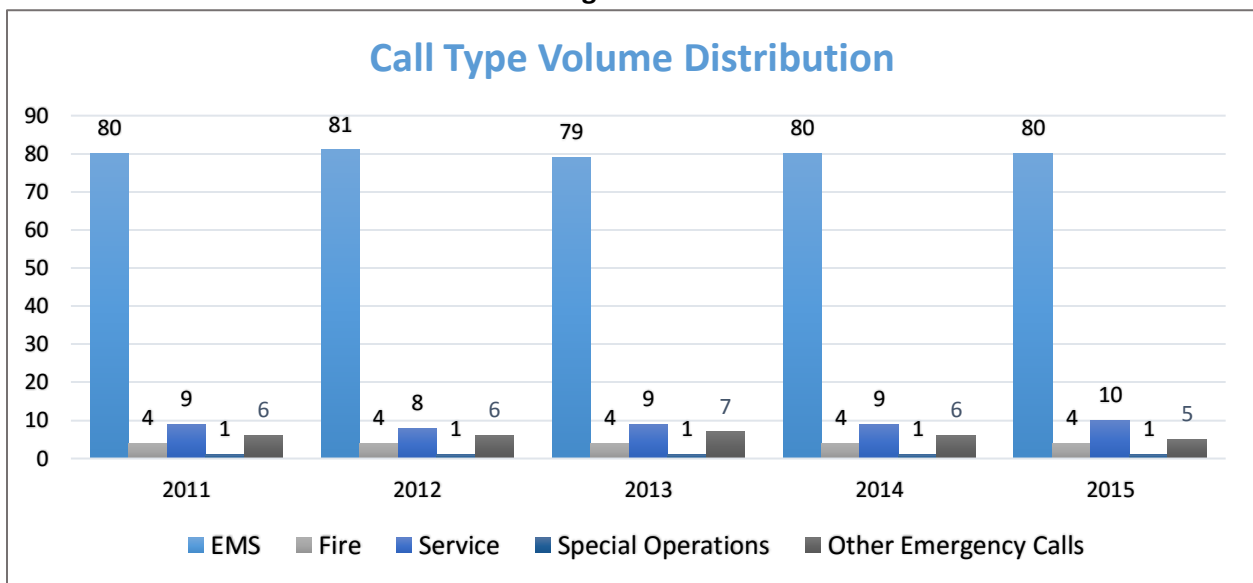
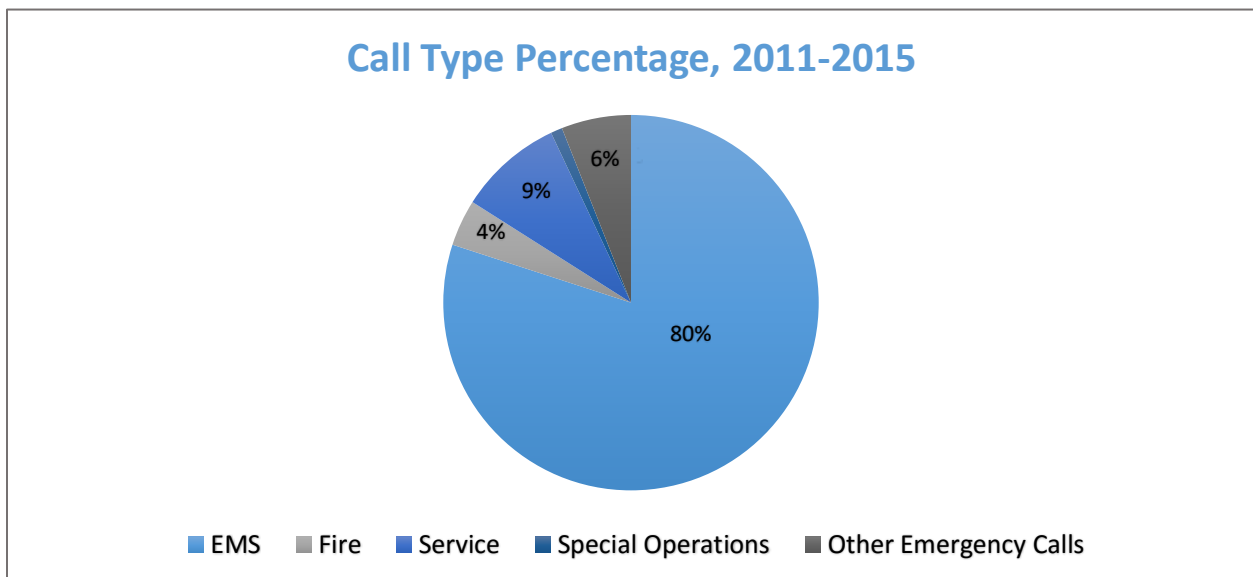


Figure 4.34



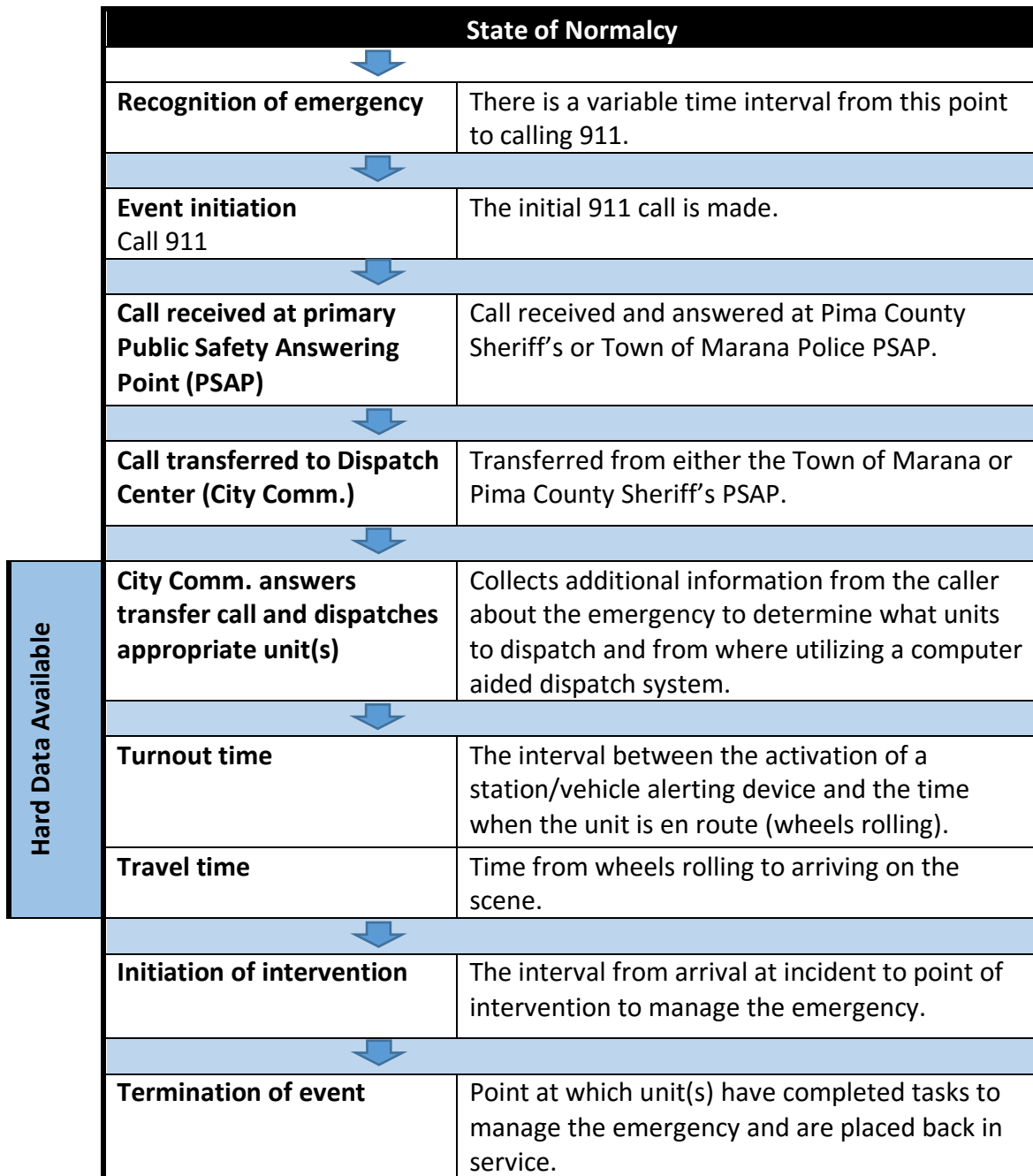


ALS Transport Call Volume

As discussed in Section 2, NWFD began ALS patient transports in June, 2015. Total ALS transports for the period of July 1, 2015 through June 30, 2016 was 4,237. This equates to an average of 11.6 transports per day.

Customer Interval Discussion

In every emergency there is a sequence of critical events that occur. The following flow chart illustrates the events that occur prior to a unit arriving to an emergency.





Response Time Performance

Demand Zones

Response times are part of the performance objective matrix and are based on Demand Zones as determined by the Northwest Fire District. NWFD as in the past two SOC editions, maintains two Demand Zones with different characteristics for total response time measurement:

- *Demand Zone A* – Generally represents the area of the District that has a greater than 1000 per square mile population density and consists of areas of medium to high density subdivisions and multi-family occupancies, medical care/extended care facilities and business/industry development. Demand Zone A represents approximately 88% of the District’s call volume.
- *Demand Zone B* – Generally represents the area of the District that has a population density of less than 1000 per square mile and consists of low density residential occupancies as well as agriculturally related development such as ranches and farms. Demand Zone B represents approximately 12% of the District’s call volume.

The boundaries for the two demand zones were adjusted for this edition of the CRA-SOC to account for new areas of the District as well as new development. The demand zones are identified geographically in Figure 4.35.

Response time performance by demand zone is presented in the tables that follow. It is categorized by the three total response time elements for which credible data are available: alarm handling, turnout time, and travel time, resulting in total response time data. Total response times for all emergency calls, EMS, fire, hazmat and TRT are listed in Figures 4.36 – 4.40 for Demand Zone A and B.



Figure 4.36 – All Emergency Calls

Demand Zone A	ALL EMERGENCY CALLS (min:sec) 90 TH percentile		2011-2015 n = 40,262	2015 7,962	2014 7,844	2013 8,240	2012 8,381	2011 7,835
	Alarm Handling	Pick up to dispatch	1:57	1:56	2:20	1:53	1:45	1:30
	Turnout time		1:25	1:16	1:27	1:27	1:29	1:21
	Travel Time	Travel time 1 st unit Distribution	5:05	5:08	5:06	5:13	5:06	4:53
		Travel Time ERF Concentration	14:00	7:44	12:25	14:03	14:43	11:18
	Total Response Time	Total Response Time 1 st unit Distribution	7:43	7:39	8:02	7:52	7:41	7:08
		Total Response Time - ERF Concentration*	19:24	16:46	17:42	19:57	19:26	13:56

Demand Zone B	ALL EMERGENCY CALLS (min:sec) 90 TH percentile		2011-2015 n = 5,023	2015 1,035	2014 1,032	2013 964	2012 1,000	2011 972
	Alarm Handling	Pick up to dispatch	1:57	1:56	2:20	1:55	1:40	1:33
	Turnout time		1:29	1:19	1:31	1:31	1:35	1:27
	Travel Time	Travel time 1 st unit Distribution	7:08	7:30	6:50	7:25	7:04	6:50
		Travel Time ERF Concentration	18:11	18:11	14:31	15:43	Insuff. Data	19:02
	Total Response Time	Total Response Time 1 st unit Distribution	10:05	9:51	10:00	10:06	9:35	9:06
		Total Response Time - ERF Concentration*	Insufficient data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data

*Represents moderate to high risk fire ERF



Figure 4.37 – Fire Calls

Demand Zone A	ALL FIRE CALLS (min:sec) 90 TH percentile		2011-2015 n = 2,040	2015 401	2014 392	2013 436	2012 409	2011 402
	Alarm Handling	Pick up to dispatch	1:46	1:28	1:54	2:06	1:38	1:46
	Turnout time		2:13	1:54	2:08	12:25	2:27	2:12
	Travel Time	Travel time 1 st unit Distribution	5:45	5:59	5:51	6:06	5:36	5:26
		Travel Time ERF Concentration	14:01	12:25	14:03	15:43	14:43	11:18
	Total Response Time	Total Response Time 1 st unit Distribution	8:31	8:27	8:44	8:57	8:30	8:18
		Total Response Time - ERF Concentration	19:26	15:29	17:42	19:57	19:26	13:56

Demand Zone B	ALL FIRE CALLS (min:sec) 90 TH percentile		2011-2015 n = 513	2015 118	2014 108	2013 112	2012 89	2011 86
	Alarm Handling	Pick up to dispatch	1:52	1:29	1:51	2:36	2:02	1:29
	Turnout time		2:01	1:47	1:59	2:05	2:15	1:57
	Travel Time	Travel time 1 st unit Distribution	8:27	8:32	8:11	9:41	8:37	47:35
		Travel Time ERF Concentration	17:30	12:17	36:27	15:43	Insuff. data	19:02
	Total Response Time	Total Response Time 1 st unit Distribution	10:59	10:28	11:12	13:07	11:21	9:59
		Total Response Time - ERF Concentration	Insufficient data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data



Figure 4.38 - EMS Calls

Demand Zone A	ALL EMS CALLS (min:sec) 90 TH percentile		2011-2015 n = 39,768	2015 7,877	2014 7,739	2013 8,125	2012 8,281	2011 7,746
	Alarm Handling	Pick up to dispatch	1:54	1:54	2:18	1:49	1:43	1:31
	Turnout time		1:24	1:16	1:25	1:27	1:31	1:22
	Travel Time	Travel time 1 st unit Distribution	5:04	5:07	5:05	5:13	5:06	4:53
		Travel Time ERF Concentration	No Data*	No Data*	No Data*	No Data*	No Data*	No Data*
	Total Response Time	Total Response Time 1 st unit Distribution	7:36	7:37	7:59	7:50	7:40	7:07
		Total Response Time - ERF Concentration	No Data*	No Data*	No Data*	No Data*	No Data*	No Data*

Demand Zone B	ALL EMS CALLS (min:sec) 90 TH percentile		2011-2015 n = 4,943	2015 1,020	2014 1,013	2013 969	2012 981	2011 960
	Alarm Handling	Pick up to dispatch	1:55	1:55	2:18	1:52	1:40	1:34
	Turnout time		1:30	1:23	1:30	1:33	1:36	1:27
	Travel Time	Travel time 1 st unit Distribution	7:07	7:30	6:48	7:24	7:02	6:47
		Travel Time ERF Concentration	No Data	No Data*	No Data*	No Data*	No Data*	No Data*
	Total Response Time	Total Response Time 1 st unit Distribution	9:40	9:47	9:49	9:56	9:29	9:03
		Total Response Time - ERF Concentration	No Data*	No Data*	No Data*	No Data*	No Data*	No Data*

*No ERF data listed due to transports provided by outside agency during all or part of the data collection period.



Figure 4.39 – Hazmat Calls

Demand Zone A	ALL HAZMAT CALLS (min:sec) 90 TH percentile		2011-2015 n = 309	2015 71	2014 67	2013 63	2012 63	2011 45
	Alarm Handling	Pick up to dispatch	1:49	1:30	1:51	2:01	1:54	1:40
	Turnout time		1:36	1:28	1:38	1:40	1:39	1:17
	Travel Time	Travel time 1 st unit Distribution	6:07	5:38	6:11	6:31	5:55	6:07
		Travel Time ERF Concentration	Insufficient Data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data
	Total Response Time	Total Response Time 1 st unit Distribution	8:40	8:09	8:18	9:52	10:07	9:24
		Total Response Time - ERF Concentration	Insufficient data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data

Demand Zone B	ALL HAZMAT CALLS (min:sec) 90 TH percentile		2011-2015 n = 72	2015 14	2014 24	2013 14	2012 14	2011 6
	Alarm Handling	Pick up to dispatch	1:31	1:43	1:26	2:34	1:14	1:25
	Turnout time		1:45	1:26	1:34	1:59	1:28	1:45
	Travel Time	Travel time 1 st unit Distribution	8:12	8:27	7:35	5:59	5:44	6:35
		Travel Time ERF Concentration	Insufficient Data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data
	Total Response Time	Total Response Time 1 st unit Distribution	10:24	10:52	10:13	8:28	9:07	9:42
		Total Response Time - ERF Concentration	Insufficient Data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data



Figure 4.40 – TRT Calls

Demand Zone A	ALL TRT CALLS (min:sec) 90 TH percentile		2011-2015 n = 21	2015 2	2014 4	2013 4	2012 7	2011 4
	Alarm Handling	Pick up to dispatch	1:57	1:01	2:46	2:59	2:49	1:50
	Turnout time		1:51	1:15	1:51	1:58	2:54	1:23
	Travel Time	Travel time 1 st unit Distribution	5:57	4:57	5:19	5:57	4:28	7:02
		Travel Time ERF Concentration	Insufficient data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data
	Total Response Time	Total Response Time 1 st unit Distribution	8:17	6:47	20:04	8:17	7:11	9:08
		Total Response Time - ERF Concentration	Insufficient data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data

Demand Zone B	ALL TRT CALLS (min:sec) 90 TH percentile		2011-2015 n = 16	2015 2	2014 4	2013 0	2012 3	2011 7
	Alarm Handling	Pick up to dispatch	2:54	1:41	2:48	Insuff. data	2:25	5:30
	Turnout time		4:26	1:51	3:32	Insuff. data	2:12	7:00
	Travel Time	Travel Time 1 st unit Dist.	8:42	9:08	8:33	Insuff. data	18:10	8:42
		Travel Time ERF Concentration	Insufficient data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data
	Total Response Time	Total Response Time 1 st unit Distribution	12:00	17:42	12:00	Insuff. data	20:35	11:10
		Total Response Time - ERF Concentration	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data	Insuff. data



Section 5

Evaluation of Current Deployment and Performance

Section 4 presented current deployment and performance data. This section evaluates deployment and performance in comparison to established District performance objectives and associated elements such as total response time. Comparison factors include NWFD performance standards as well as nationally recognized consensus standards. The section concludes with a deployment and performance comparison with six other similar sized CFAI accredited departments/districts.

Community Expectations

Prior to assessing deployment and performance, it is important to have a clear understanding of community expectations. As part of a strategic planning process in 2013, two external shareholder workshops were held to gain input about service delivery types and expectations on service delivery levels. Attendees represented a wide range of positions, occupations, and associations within the District. Details of the external workshop input can be found in the District's Strategic Plan. The workshops included a review of proposed performance objectives and aspects of total response time. As part of a strategic planning update process in summer, 2016 additional input was gained in a similar style workshop that included members of the 2013 feedback group.

From the 2016 external shareholder input process, two main conclusions were evident:

- The stakeholders felt that NWFD should continue service delivery types and the associated service performance levels as is currently being provided.
- While desiring to see better response times, the stakeholders understood some of the major barriers associated with making substantial improvements, but indicated that the District should press forward with efforts to bring the call processing times closer to the national standard.

Service Level Performance Objectives

Service level performance objectives were developed based on community expectations, risk assessment, critical task development, and the demand zones as described in Section 4. Performance objectives for each emergency service level are described on the following pages. This is followed by a summary of each of the response time components and total response time performance for 2015, the most relevant year in terms of analyzing performance. Descriptions of each of the service level risk categories that are listed in the performance objectives can be found in Section 3, Community Risk Assessment.



Total response time measurements (alarm processing time + turn-out time + travel time) for the performance objectives are listed by demand zone and by three levels of measurement:

- *2015 Baseline Performance* – the actual total response time performance for the 2015 calendar year.
- *NWFD Standard* – the total response time standard that the District desires to achieve on a daily basis.
- *Benchmark* – a longer term total response time goal the District strives for that likely involves an increase in the current staffing and fixed/mobile resource model.

Total response times are provided for the first-due company and the effective response force (ERF). All response times are reported in minutes and seconds and at the 90th percentile. Description of the various risk categories are found in Section 3, Community Risk Assessment.

Fire Suppression

Low Risk Fires

Performance Objective – To extinguish fire found and prevent the spread to adjacent exposures. The first arriving engine company shall initiate rescue (if necessary) and applicable fire attack operations.

Deployment – An initial effective response force of a minimum of four personnel consisting of a single engine company.

Measure – Total response time.

Demand Zone	A	B
2015 Baseline Performance	8:53	10:43
NWFD Standard	8:15	10:15
Benchmark	7:15	9:15

Moderate to High Risk Structure Fires

Performance Objective – To stop the escalation of a fire where found. This includes search and rescue for victims, confining the fire to the room of origin, limiting the heat and smoke damage to immediate area of the room of fire origin; expected actions include the use of applicable fire suppression and ventilation tactics, providing for a rapid intervention crew, providing for property conservation, and protecting adjacent exposures.

Deployment – An initial effective response force (ERF) of a minimum of 20 personnel consisting of three engine companies, one ladder company²⁵, one rescue company, one incident safety officer and one battalion chief.

²⁵ Depending on the occupancy, stations where ladder apparatus are assigned the station captains have the discretion of taking an engine or ladder to an incident.



Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	8:07	16:36	8:48	No data
NWFD Standard	8:15	12:45	10:15	14:45
Benchmark	7:15	11:45	9:15	13:45

Maximum Risk Structure Fires²⁶

Performance Objective - To stop the escalation of a fire where found. This includes search and rescue for victims, confining the fire to the room of origin, limiting the heat and smoke damage to immediate area of the room of fire origin; expected actions include the use of applicable fire suppression and ventilation tactics, providing for a rapid intervention crew, providing for property conservation, and protecting adjacent exposures.

Deployment - An initial effective response force of a minimum of 29 personnel consisting of four engine companies, two ladder companies, one rescue company, 1 incident safety officer, and two battalion chiefs.

Measure: - Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	N/A	N/A	N/A	N/A
NWFD Standard	8:15	15:00	10:15	17:30
Benchmark	7:15	14:00	9:15	16:30

Emergency Medical Services

Low Risk

Performance Objective – Stop the escalation of a medical emergency, within the capabilities of the effective response force. Specifically, to determine and provide appropriate level of care and if required, determine the level of transportation (BLS or ALS) to most appropriate definitive care facility.

Deployment – An initial effective response force of a minimum of four personnel consisting of a single engine company.

Measure - Total response time.

Demand Zone	A	B
2015 Baseline Performance	7:37	10:55
NWFD Standard	7:45	9:45
Benchmark	6:45	8:45

²⁶ Maximum risk category and the associated effective response force is new as of this CRA-SOC edition, therefore there is no response data history.



Moderate Risk

Performance Objective – Stop the escalation of the medical emergency, within the capabilities of the effective response force. Specifically, assess patient and prioritize care to minimize death and disability that includes providing advanced life support and transporting to the most appropriate definitive care facility.

Deployment – An effective response force of six personnel consisting of one engine company and one rescue company to initiate advanced life support activities as appropriate.

Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	7:46	8:30	9:47	11:38
NWFD Standard	7:45	9:15	9:45	11:45
Benchmark	6:45	8:15	8:45	10:00

High Risk

Performance Objective – Stop the escalation of the medical emergency, within the capabilities of the effective response force. Specifically, assess patient(s) and prioritize care to minimize death and disability, that includes providing advanced life support, and transporting to the most appropriate definitive care facility.

Deployment – An effective response force of 12 personnel consisting of two engine companies, one rescue company, one EMS captain and one battalion chief to initiate advanced life support activities as appropriate.

Measure - Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	7:42	9:45	10:41	Insuff. data
NWFD Standard	7:45	9:45	9:45	12:45
Benchmark	6:45	8:45	8:45	12:45

Maximum Risk

Performance Objective – Stop the escalation of the medical emergency, within the capabilities of the effective response force. Specifically, assess patient(s) and prioritize care to minimize death and disability, that includes providing advanced life support, and transporting to the most appropriate definitive care facility.

Deployment – An effective response force of 20 personnel consisting of three engine companies, three rescue companies, one EMS captain and one battalion chief to initiate advanced life support activities and transport as appropriate for patients, depending on patient condition.

Measure – Total response time.



Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	No data	Insuff. data	Insuff. data
NWFD Standard	7:45	11:45	10:15	13:45
Benchmark	6:45	10:45	8:45	12:45

Hazardous Materials

Low Risk

Performance Objective – To isolate/identify the hazardous material(s) that created the emergency and effect evacuations as necessary. A limited offensive strategy may be utilized at this level, limited by the number and capabilities/competencies²⁷ of the Operations level personnel on the responding company.

Deployment – An initial effective response force of consisting of four Operations level personnel on one engine company.

Measure - Total response time.

Demand Zone	A	B
2015 Baseline Performance	8:32	10:52
NWFD Standard	8:15	10:15
Benchmark	6:45	9:15

Moderate Risk

Performance Objective – To isolate/identify the hazardous material(s) that created the emergency and effect evacuations as necessary. Test, sample, contain, extinguish, and/or abate the hazard(s). This includes utilizing any kind of specialized gear, tools, equipment, or knowledge that the NWFD hazmat team or other outside resources may have a need for.

Deployment – An initial effective response force of 12 personnel consisting of one engine operations level engine company, one special operations engine company, one special operations hazmat apparatus, one special ops rescue, one incident safety officer, and one battalion chief.

Measure - Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	11:45	10:15	13:45
Benchmark	6:45	10:45	9:15	12:45

²⁷ As defined in NFPA 472, Standard for Competence for Responders to Hazardous Materials/Weapons of Mass Destruction Incidents, 2013 Edition, Chapter 5. Special Operations members are trained to the NFPA 472 Chapter 7, technician level with some members qualified at the specialist level as well.



High to Maximum Risk

Performance Objective – To isolate/identify the hazardous material(s) that created the emergency and effect evacuations as necessary. Test, sample, contain, extinguish, and/or abate the hazard(s). This includes utilizing any kind of specialized gear, tools, equipment, or knowledge that the NWFD hazmat team or other outside resources may have a need for. This risk level requires more resources to accomplish the same objectives as a moderate risk hazardous materials event.

Deployment – An initial effective response force of 22 personnel consisting of two operations level engine companies, two special operations engine companies, one rescue company, one special operations hazmat apparatus, one incident safety officer, and one battalion chief. Should the scale of the incident exceed NWFD's resources, additional required hazmat response resources are obtained through the Pima Regional Hazmat Team with varied response times depending on daily staffing and response point of origin.

Measure - Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	13:45	10:15	15:45
Benchmark	6:45	12:45	9:15	14:45

Technical Rescue – Extrication

Low Risk

Performance Objective – To extricate victim safely with minimum property damage.

Deployment – An initial effective response force of four personnel consisting of one engine company.

Measure - Total response time.

Demand Zone	A	B
2015 Baseline Performance	*	*
NWFD Standard	8:15	10:15
Benchmark	6:45	9:15

Moderate Risk

Performance Objective – Stabilize all hazard elements of the scene, provide rapid and safe extrication for patient(s), provide medical care and transport as necessary.

Deployment – An initial effective response force of 12 personnel consisting of two engine companies, one rescue company, one incident safety officer, and one battalion chief.

Measure – Total response time.



Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	6:54	Insuff. data	10:54	Insuff. data
NWFD Standard	8:15	9:45	10:15	11:45
Benchmark	6:45	8:45	9:15	10:45

High Risk

Performance Objective – Stabilize all hazard elements of the scene, provide rapid and safe extrication for patient(s), provide medical care and transport as necessary.

Deployment – An initial effective response force of 22 personnel consisting of one engine company, two special operations engine companies, one squad, two rescue companies, one incident safety officer and one battalion chief.

Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	13:45	10:15	15:45
Benchmark	6:45	12:45	9:15	14:45

Technical Rescue – Low/High Angle Rescue

Low Risk

Performance Objective – Safely remove victim from low angle, short distance incident, medically treat as appropriate, transport to ground or air transport unit as needed.

Deployment – An initial effective response force of four personnel consisting of one engine company.

Measure – Total response time.

Demand Zone	A	B
2015 Baseline Performance	Insuff. data	Insuff. data
NWFD Standard	8:15	10:15
Benchmark	6:45	9:15

Moderate/High Risk

Performance Objective – Safely remove victim from low/high angle or long distance incident, medically treat as appropriate, transport to ground or air transport unit as needed.

Deployment – An initial effective response force of 14 personnel consisting of one engine company, one special operations engine company, one squad, one rescue company, one incident safety officer and one battalion chief.

Measure – Total response time.



Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	13:00	10:15	15:00
Benchmark	6:45	11:00	9:15	13:00

Swift Water Rescue

Low Risk

Performance Objective – Safely remove victim from low depth-slow water incident, medically treat as appropriate, transport to ground or air transport unit as needed.

Deployment – An initial effective response force of four personnel consisting of one engine company.

Measure – Total response time.

Demand Zone	A	B
2015 Baseline Performance	Insufficient data	Insufficient data
NWFD Standard	8:15	10:15
Benchmark	6:45	9:15

Moderate Risk

Performance Objective – Safely remove victim from a moderate depth swift water incident, medically treat as appropriate, transport to ground or air transport unit as needed.

Deployment – An initial effective response force of 14 personnel consisting of one engine company, one special operations engine company, one squad, one rescue company, one incident safety officer and one battalion chief.

Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	13:00	10:15	15:00
Benchmark	6:45	11:00	9:15	13:00

High Risk

Performance Objective – Safely remove victim from a moderate to deep depth, complex swift water incident, medically treat as appropriate, transport to ground or air transport unit as needed.

Deployment – An initial effective response force of 22 personnel consisting of one engine company, one ladder company, two special operations engine companies, one squad, one special ops rescue company, one rescue company, one incident safety officer and one battalion chief.



Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	15:00	10:15	17:00
Benchmark	6:45	13:00	9:15	15:00

Technical Rescue – Confined Space and Trench Rescue

High Risk

Performance Objective – Safely remove victim from confined space or trench rescue incident. Decon if necessary, medically treat as appropriate, transport to appropriate medical facility as necessary.

Deployment – An initial effective response force of 22 personnel consisting of two engine companies, two special ops engine companies, one rescue company, one incident safety officer and one battalion chief.

Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	15:00	10:15	17:00
Benchmark	6:45	13:00	9:15	15:00

Technical Rescue – Structural Collapse

Moderate Risk

Performance Objective – Stabilize all hazard elements of the scene, provide rapid and safe extrication for patient(s), and provide medical care and patient transport as necessary.

Deployment – An initial effective response force of 14 personnel consisting of one engine company, one special operations engine company, one special operations squad, one special operations rescue company, one rescue company, one incident safety officer, and one battalion chief.

Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	13:00	10:15	15:00
Benchmark	6:45	11:00	9:15	13:00



High Risk

Performance Objective – Stabilize all hazard elements of the scene, provide rapid and safe extrication for patient(s), provide medical care and transport as necessary.

Deployment – An initial effective response force of 22 personnel consisting of one engine company, two special operations engine companies, one squad, two rescue companies, one incident safety officer and one battalion chief.

Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	15:00	10:15	17:00
Benchmark	6:45	13:00	9:15	15:00

Wildland Fire

Low Risk

Performance Objective – To contain the fire and prevent the spread to any exposures. The first arriving engine company shall be capable of utilizing wildland strategy and tactics from the National Wildfire Coordinating Group Wildland Incident Field Guide including basic scratch line construction, direct fire suppression, and mop up operations to complete extinguishment.

Deployment – An initial effective response force of a minimum of four personnel consisting of one engine company.

Measure - The total response time.

Demand Zone	A	B
2015 Baseline Performance	8:35	10:53
NWFD Standard	8:15	10:15
Benchmark	6:45	9:15

Moderate Risk

Performance Objective – To contain the fire and prevent the spread to any exposures. The effective response force shall be capable of utilizing wildland strategy and tactics from the National Wildfire Coordinating Group Wildland Incident Field Guide including basic scratch line construction, direct fire suppression, and mop up operations to complete extinguishment.

Deployment – An initial effective response force (ERF) of a minimum of 10-12 personnel consisting of one engine company, one Type 3 or 6 wildland engine, one water tender, one incident safety officer and one battalion chief.

Measure - Total response time.



Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	14:00	10:15	15:00
Benchmark	6:45	13:00	9:15	14:00

High Risk (WUI)

Performance Objective – To contain the fire and prevent the spread to any exposures. The effective response force shall be capable of utilizing wildland strategy and tactics from the National Wildfire Coordinating Group Wildland Incident Field Guide including basic scratch line construction, direct fire suppression, standard WUI suppression tactics, and mop-up operations to complete extinguishment.

Deployment – An initial effective response force (ERF) of a minimum of 24 personnel consisting of four engine companies, one rescue company, two Type 3 or 6 wildland engines, two water tenders, one incident safety officer and one battalion chief.

Measure - Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	Insuff. data	Insuff. data	Insuff. data	Insuff. data
NWFD Standard	8:15	17:00	10:15	19:00
Benchmark	6:45	15:00	9:15	17:00

Aviation Rescue Fire and Firefighting

Moderate Risk

Performance Objective – To provide for rescue, treatment, and transport of viable patients, suppress any fire, and prevent the spread of fire to any exposures.

Deployment – An initial effective response force (ERF) of a minimum of 12 personnel consisting of two engine companies, one rescue company, one water tender, one ARFF unit, one incident safety officer and one battalion chief.

Measure - Total response time.

Demand Zone	A*		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	N/A	N/A	N/A	N/A
NWFD Standard	N/A	N/A	10:15	14:45
Benchmark	N/A	N/A	3:00	10:00

*ARFF services defined services for Marana Regional Airport, located in Demand Zone B.

High Risk

Performance Objective - To provide for rescue, treatment, and transport of savable victims, suppress any fire, and prevent the spread of fire to any exposures.

Deployment – An initial effective response force (ERF) of a minimum of 18 personnel consisting of two engine companies, one special ops engine company, one squad, one rescue company, one



special operations rescue, one water tender, one ARFF unit, one incident safety officer and one battalion chief.

Measure - Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	N/A	N/A	No data	No data
NWFD Standard	N/A	N/A	10:15	16:45
Benchmark	N/A	N/A	3:00	12:45

Maximum Risk

Performance Objective – To provide for rescue, treatment, and transport of savable victims, suppress any fire, and prevent the spread of fire to any exposures.

Deployment – An initial effective response force (ERF) of a minimum of 24 personnel consisting of three engine companies, one special ops engine company, two rescue companies, one special operations rescue, one special operations squad, one water tender, one ARFF unit, one incident safety officer and one battalion chief.

Measure – Total response time.

Demand Zone	A		B	
	First-due	ERF	First-due	ERF
2015 Baseline Performance	N/A	N/A	No data	No data
NWFD Standard	N/A	N/A	10:15	18:45
Benchmark	N/A	N/A	3:00	14:45

General Performance Discussion for all Measurable Components of Total Response Time

Dispatch Systems Performance

The area dispatch system consists of three elements, 1) receipt and transfer of the initial 911 call involving a public safety answering point (PSAP), 2) receiving (call answering) PSAP transfer calls at the dispatch center, and 3) dispatch of appropriate NWFD resources at the Dispatch Center.

PSAP Dispatch Component

Emergency request calls for NWFD services are first received at one of two public safety answering point (PSAP), call centers that are responsible for answering 911 calls for police, fire-rescue, and emergency medical services. The PSAP's receiving 911 calls for NWFD are the Pima County Sheriff's Department and the Marana Police Department. Call for NWFD services are routed from these PSAP's to the Dispatch Center that in turn dispatches the appropriate NWFD resources.



While NFPA 1221, Standard for Installation, Maintenance, and Use of Emergency Services Communications Systems, 2016 Edition, has a PSAP transfer performance standard of ≤ 30 seconds 95% of the time, currently neither of the PSAP centers are formally tracking the transfer times, thereby preventing any type of performance evaluation. However, it is generally acknowledged by the PSAP centers that typically the transfer times are between 15 and 30 seconds.

PSAP Call Answering

Currently NWFD contracts with the City of Tucson for Dispatch Center services. This includes the answering of PSAP transferred calls and the associated dispatching of appropriate NWFD resources. Under the current hardware system, PSAP transferred call answering data is not available. With the installation of a new system in the first quarter of 2017, this data will be available to measure against the relevant NFPA 1221 performance standard.

Alarm Handling (call processing)

Currently NWFD contracts with the City of Tucson for dispatching services. A five-year summary of alarm handling at the 90th percentile and the associated NFPA Standard 1221, 2016 edition is listed in Figure 5.1. NWFD has adopted the NFPA 1221 alarm handling standard at the 90th percentile measure as an internal standard it strives for on daily basis.

Figure 5.1
Alarm Handling Performance 2011-2015 (Demand Zone A)

Year	Baseline Alarm Handling Time (min:sec) 90 th Percentile	NFPA 1221 Standard	Variance in Seconds from NFPA 1221 Standard	Percentage by Time Exceeding NFPA 1221 Standard
2011	1:30	$\leq 1:04$	26 sec	41%
2012	1:45		41 sec	64%
2013	1:53		49 sec	77%
2014	2:20		76 sec	119%
2015	1:56		52 sec	81%
2011-2015 avg.	1:57		53 sec	83%

Figure 5.1 indicates there is substantial room for improvement regarding alarm handling times. Improvement for this response time dimension is a high priority for the District. Every 30-40 seconds improvement in alarm handling times equates to theoretically moving the station nearly a half mile closer to the call.

Although there have been several key factors put in place in recent years that are leading to improvements in alarm handling times, we continue to look for more impactful solutions. In 2014 NWFD assigned a 40-hour captain to the dispatch center to act as the District's liaison officer and assist with training of dispatchers. In 2013, Tucson Fire Department took over management and operation of the dispatch center; there has been a learning curve



associated with that change, but in the past 18 months there have been improvements in alarm handling times. Other examples of improvements implemented in the past year include providing dispatchers with additional training, adjusting the EMS dispatch protocol, as well as other improvement elements. In October 2016 a new call alerting system was installed that is expected to result in a 15 to 20 second reduction in call processing times.

Turnout Time Performance

Turnout time is defined as the time when a station or unit in the field is notified of a dispatch until the point of initial response. NWFD defines the point of initial response as when “the wheels begin to roll” en route to the incident. NWFD measures turnout times based on time of day, and by two categories of service delivery, Fire (includes hazmat, TRT and wildland) and EMS as presented in Figure 5.2. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, Chapter 4 states that the turnout time for fire and special operations should be 1 minute, 20 seconds. NWFD believes this is an unrealistic time standard for firefighters to don a structural PPE ensemble and be seat-belted in an apparatus prior to the vehicle moving. Accordingly, as shown in Figure 5.2 NWFD has set a time standard at the 90th percentile during “awake” hours of one minute, 30 seconds, and during “sleeping hours,” two minutes, 0 seconds.

Figure 5.2
2015 Turnout Performance

Time Period	Fire/Hazmat/TRT		EMS	
	Baseline	NWFD Standard	Baseline	NWFD Standard
0700-2100 hrs. (awake hours)	1:43	1:30	1:14	1:00
2101-0659 hrs. (sleeping hours)	2:15	2:00	1:58	1:30

Turnout time for all call classifications was 1:18 at the 90th percentile for 2015, a respectable time. While turnout times have improved during the past five-year accreditation period, the more detailed data in the table above indicates that there is room for improvement at all levels of this measurement, but particularly for EMS turnout times at night. With the implementation of monthly response time reports distributed to all battalion chiefs and company officers, and the implementation of the new call alerting system which includes countdown clocks in the apparatus bays (see below), improvement in turn out times is expected in the coming year.



Newly installed turnout countdown clock in one of NWFD's stations

Travel Time Performance

Travel time is defined as the time the unit response begins (wheels rolling) to when the unit arrives on scene. NWFD follows NFPA 1500 and VFIS applicable apparatus operating and driving standards in the development of SOG's that guide operational responses to the scene. *Safe driving practices at NWFD are a priority*; if a responding unit fails to reach a scene because of an accident, the opportunity for NWFD to fulfill its mission in the most expeditious and effective manner has failed.

Travel times are limited by the existing road system, traffic conditions, and weather elements; in general, there is little that can be done at the Operations level to improve travel times besides having good area knowledge of the most efficient routes to a call given road construction, school zones, time of day, etc. NWFD utilizes the Opticom® preemption system to help reduce travel times. Travel time zones for first-due areas and overlaid 2015 calls are illustrated in Figure 5.3. Travel times are generally in line with the NWFD response time standards. Figure 5.4 illustrates that the distribution of non-compliant travel times is roughly parallel with call density as presented in Section 4.

Excessive travel times were noted in two response areas, in the far north-northwest first-due area for Station 37 and a shared response area for Stations 34 and 38 in the Twin Peaks/Interstate 10 area. Section 2 of this document also identified these two areas having rapid growth in the next few years. Dependent on voter approval in November, 2016, bond funding will provide for the relocation of Station 37 and a new station in the Twin Peaks/I-10 area, designated as Station 40. Figures 5.5 illustrates the current travel times, with Figure 5.6 illustrating the improvement in travel times that would result from these projects.

Figure 5.3

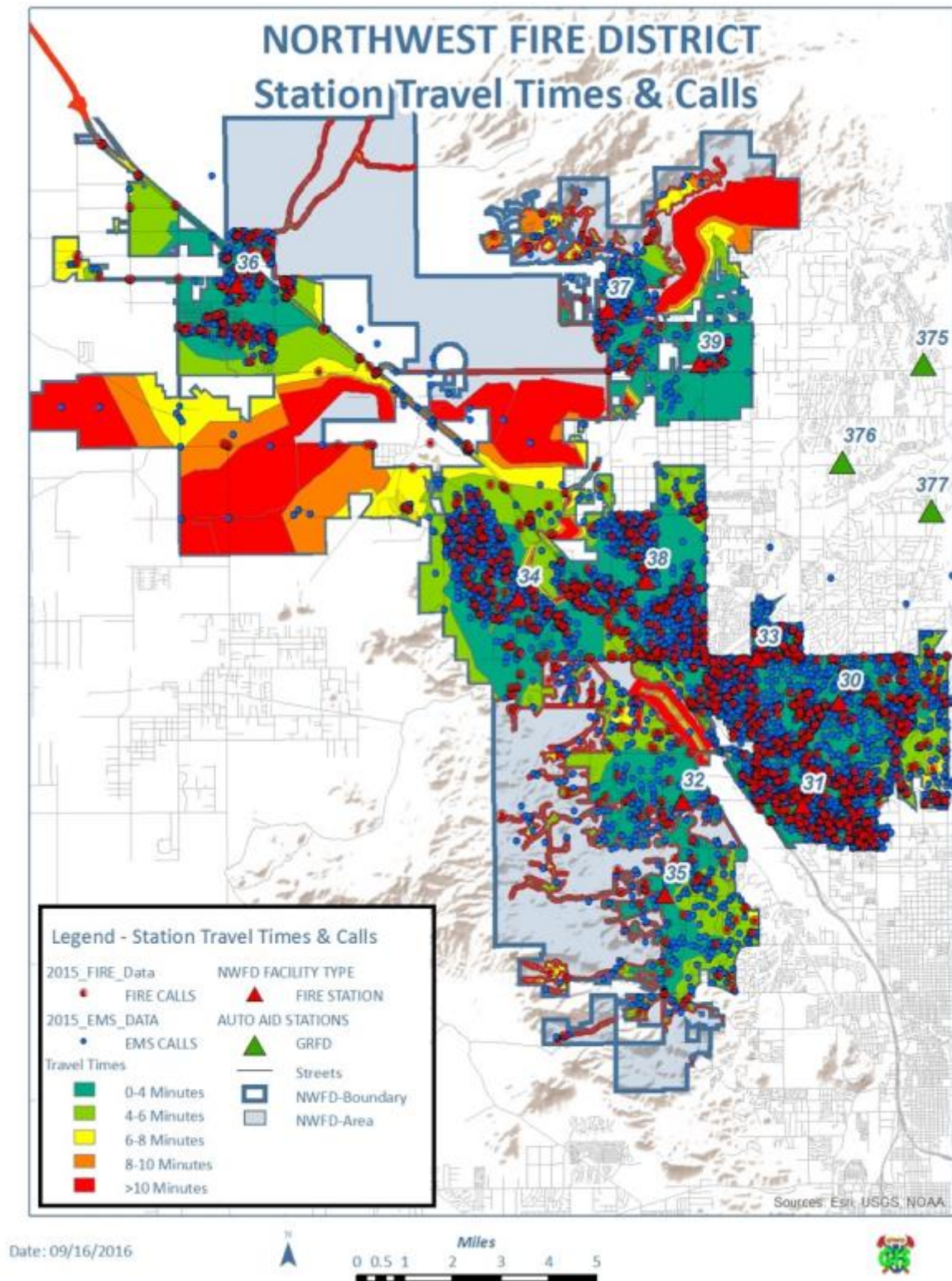


Figure 5.4

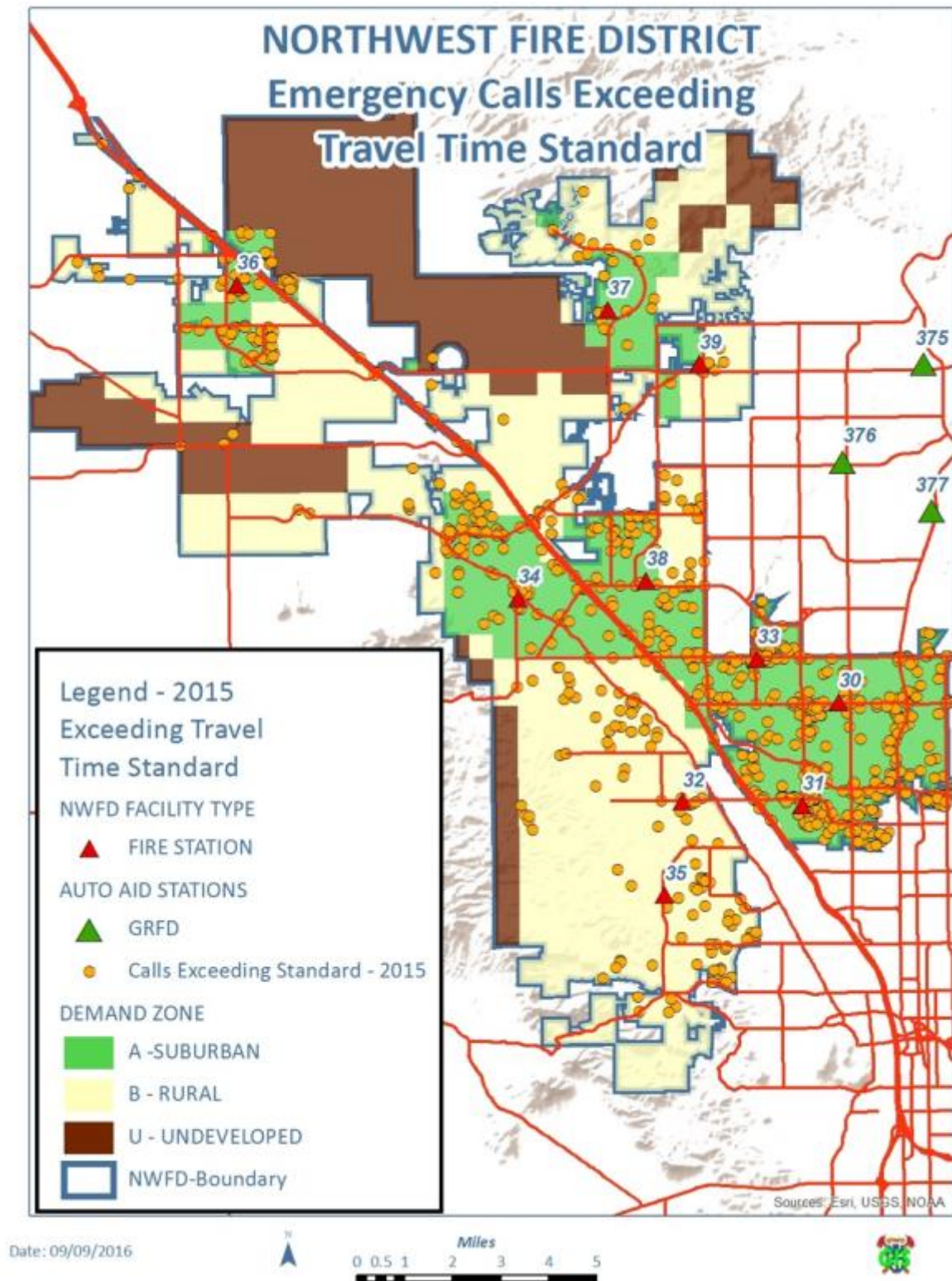


Figure 5.5

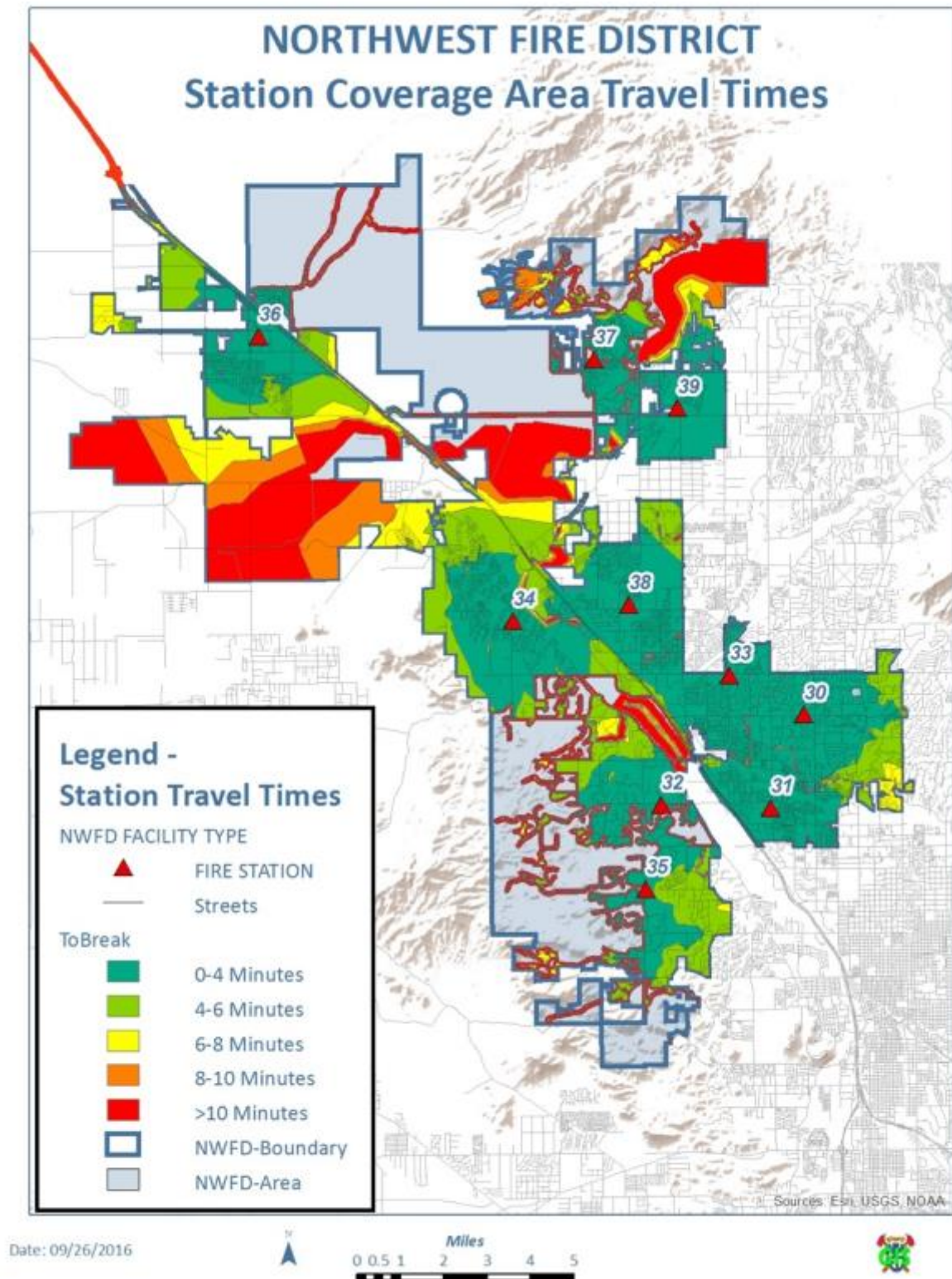
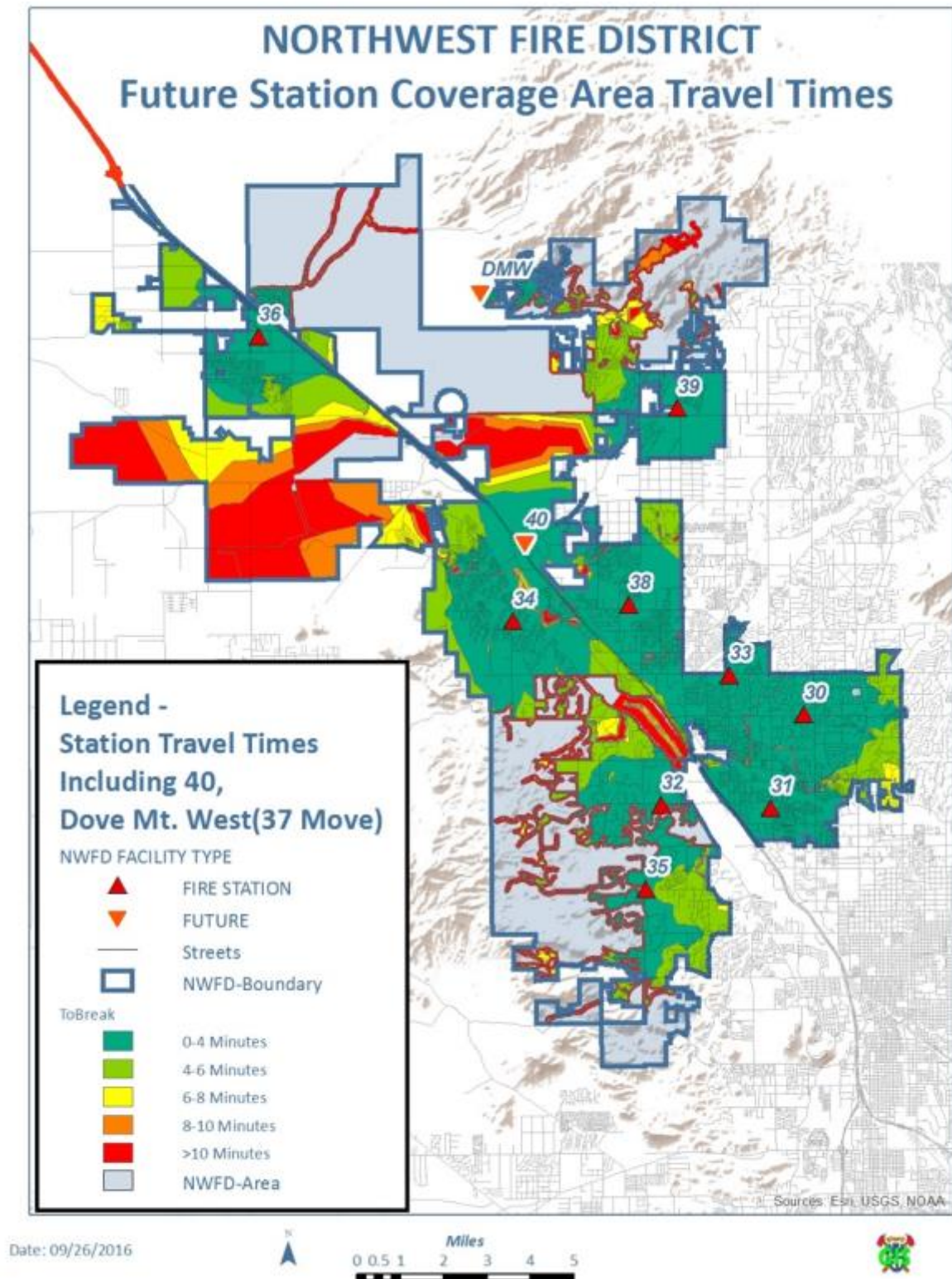


Figure 5.6



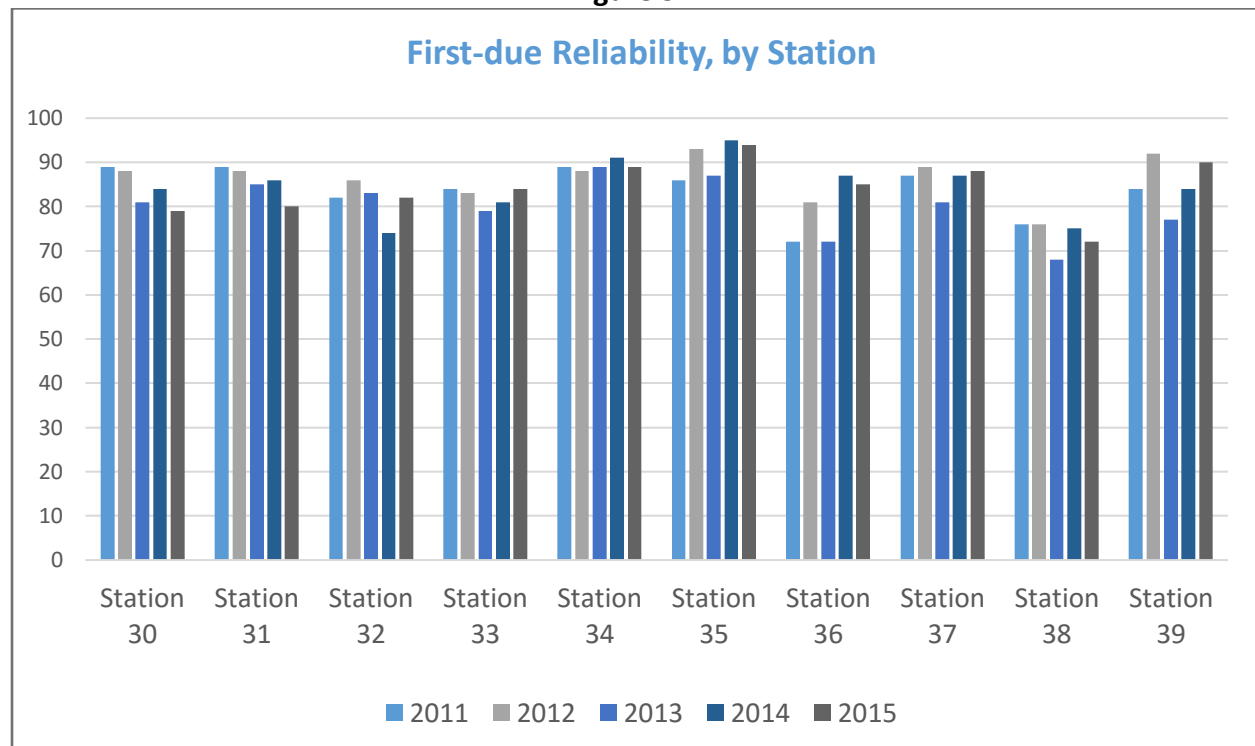
Total Response Time Evaluation

For the period of 2011-2015, total response times for all emergency calls show that times have remained relatively consistent, but with a measurable uptick. The response data reflects several identified factors that contributed to increasing response times including a nearly 12% increase in call volume from 2013 through 2105, an observable increase in traffic volume in the District, and only one rescue company (that now transports patients) placed in service for the period of 2011-2015. In reviewing the 2015 data by first-due geographical planning zones (GPZ's), total response times fluctuated somewhat between the ten GPZ's. Further analysis is needed to identify why some first due areas show minor deviation from the NWFD total response time standard.

Reliability

Reliability in context for this document can be described as “first-due” reliability, the percentage of time a company is available to respond to a call within their designated service area. With newer automatic vehicle locator technology available, the computer aided dispatch (CAD) system assigns a unit to an incident based on the calculated travel time. This is a much more efficient method to select appropriate units for an emergency. This method of dispatching requires a different level of measurement, determining the number of times a unit is available within the adopted travel time standard for one of the two demand zones. Data for this level of measurement is currently not available. The following figure represents first-due reliability from a service level perspective.

Figure 5.7

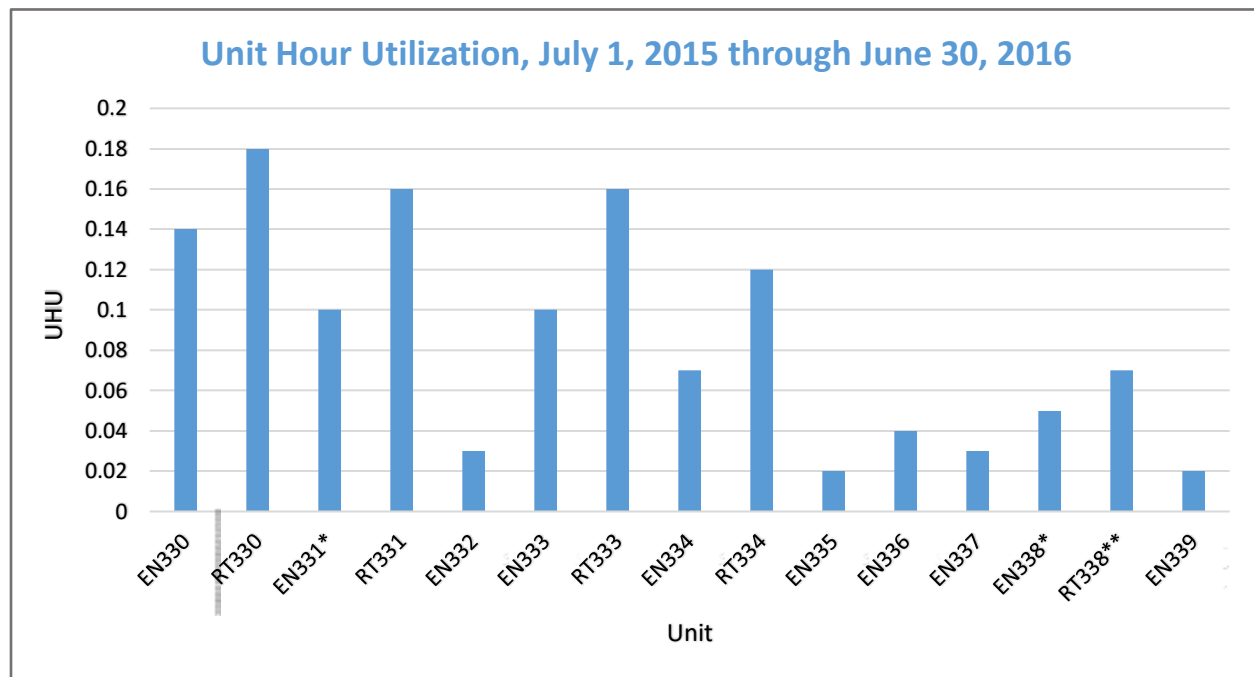


Stations 30 and 31 had the greatest decrease in reliability during this time period with a decrease of 9% and 10% respectively. Overall, Station 38 had the lowest reliability percentage, a 74% average for the period of 2011-2015.

Unit Hour Utilization

Unit Hour Utilization (UHU) is a calculation in decimal form that is the number of hours a unit is committed out of service on a scene divided by the total number of hours in a shift period. NWFD operates a three shift, 24-hour shift schedule. Based solely on out of service time, Figure 5.8 presents the UHU for each NWFD staffed unit.

Figure 5.8



*EN331 and EN338 data includes LD331 and LD338 responses since these units are cross staffed

**RT338 data includes RT336 which was in service the third quarter of 2015 prior to being reassigned as RT338.

External Agency Comparability/Benchmarking

As part of evaluating Northwest Fire District deployment and performance, a comparability/benchmarking project was completed comparing NWFD performance to similar size, accredited agencies both within Arizona and the Western Region of the U.S. This information can be found in Figure 5.9. No further analysis of this information was performed as part of the preparation of this CRA-SOC, however the intent moving forward is to analyze the comparative data against NWFD data.



Figure 5.9

Category	NWFD	Spokane Valley WA	Roseville CA	Arvada FD CO	Peoria AZ	Pueblo CO	Yuma AZ
Population	116,788	120,073	134,073	124,000	177,015	109,412	96,522
Square Miles	144	75	43	43	180	47	120
Pop/square mile	811	1600	3118	2,884	983	2,328	804
Budget	\$27,957,283	\$35,300,000	\$27,760,324	\$23,376,734	\$30,047,794	\$16,285,917	\$18,071,741
Stations	10	10	8	8	8	10	6
Frontline Engines	10*	8	8	6	8	10	7
Frontline Ladders	2**	2	2	1, 1 Rescue	2	1, 1 Rescue	2
Frontline Ambulances	5 ALS	PRIVATE Co.	PRIVATE Co.	4	2 (not IS yet)	PRIVATE Co.	4
Sworn Personnel	188	161	113	140	172	138	108
Sworn Personnel per 1000	1.61	1.34	0.84	1.13	0.97	1.26	1.12
Engine Co Staffing	4	3	3	4	4	3	3
Total # Paramedics	81	39	85	29	79	29	55
Paramedics/1000 population	0.69	0.32	0.63	0.23	0.45	0.27	0.57
Incident Total 2015	14,376	18,006	15,053	14,701	22,682	21,018	13,397
Incidents/1000 pop	123	150	112	119	128	192	139
% Calls – Medical	85%	78%	70%	74%	87%	66%	82%
% Calls – Fire	9%	8%	2%	4%	9%	2%	18%
ISO Rating	2	3	2	3	3	2	2
Alarm Processing Time	--	(90 th)	--	1:13 (90 th)	0:55 (90 th)	1:12 (90 th)	Urban (90 th)
EMS	1:51	0:49	--	--	--	--	1:50
Fire	1:45	0:59	--	--	--	--	2:18
Turnout Time (all)	--	--	--	--	0:56	1:58	--
EMS	1:16	2:05	--	1:30	--	--	1:19
Fire	1:18	3:01	--	1:39	--	--	1:26
Travel Time Total	--	--	--	--	4:39	5:35	--
Urban	5:30	6:10	--	5:22	--	--	--
Rural	6:33	10:53	--	9:32	--	--	--
EMS	--	--	--	--	--	--	4:47
Fire	--	--	--	--	--	--	5:24
Total Response Time	--	--	--	--	6:04	7:46	--
Urban	7:53	8:35	--	7:32	--	--	--
Rural	8:55	9:34	--	11:42	--	--	--
Average Annual Fire Loss 2011-2015	\$1,371,021	Started tracking 2016	\$5,420,141	\$1,751,000	Don't track yet	N/A	\$2,433,554
Fire Loss per 1000 population	\$11,740	--	\$40,527	\$14,121	--	--	\$25,212

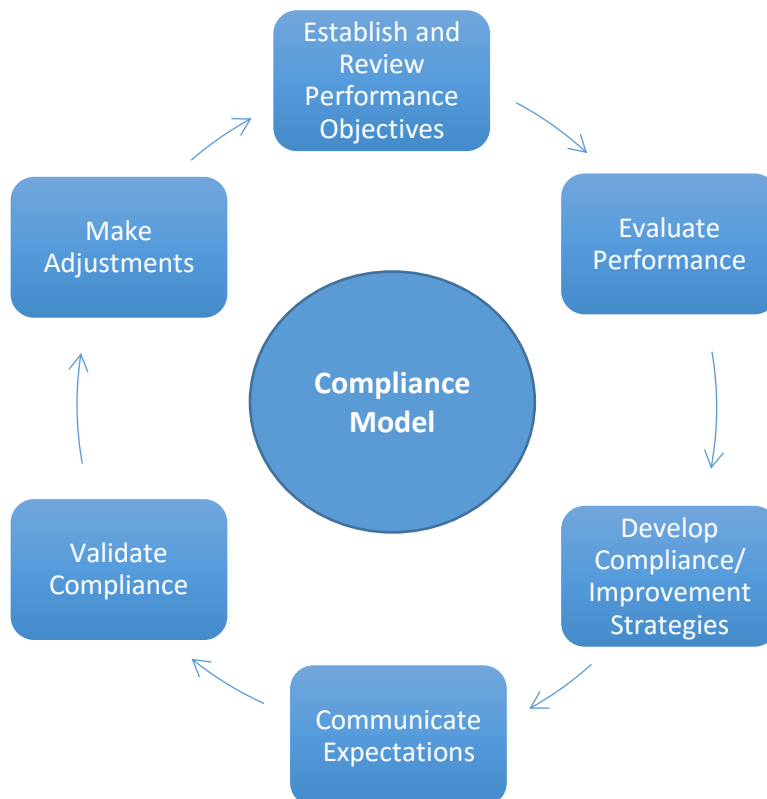
Section 6

Plan for Improving and Maintaining Response Capabilities

There is a sizeable amount of information in the form of data and various methods of measurement presented in this document. Without a plan to not only maintain, but to improve performance, this information is of minimal value.

Compliance Model

To develop a plan to maintain and improve response capabilities, NWFD began with the proven Deming Model of Plan-Do-Check-Act. Using the Deming Model as a foundation, NWFD has adopted the following compliance model that also parallels the compliance model in the CFAI Community Risk Assessment/Standard of Cover, sixth edition:





Implementing a plan to guide improving and maintaining SOC response capabilities and performance has been a weak link in the past two accreditation periods. To strengthen this weakness, the SOC team that was used to help develop this edition of the SOC will remain intact for the upcoming accreditation period. With facilitation by the Operations Division Chief and Accreditation Manager, the SOC team will be assigned the responsibility of managing the compliance model as outlined in the following steps.

Step 1 - Establish and Review Performance Objectives (CRA-SOC Sections 2-4)

To establish performance objectives, NWFD has completed the following:

- Identified services provided.
- Defined the levels of service.
- Identified and categorized levels of risk.
- Developed and reviewed performance distribution/concentration measures and associated objectives.

While much of this process may remain relatively the same with each CRA-SOC process, it is important to review the underlying organizational assumptions and ensure they are still accurate and relevant. This can be in the form of environmental scanning with an emphasis on community expectations, identifying any new risks, and assessing financial and political factors. In addition, updating and establishing any new performance measures will occur when:

- There is a change in the type(s) of services delivered by NWFD.
- New mandated laws or regulations require a change in the method of service delivery by NWFD.
- Significant change in NWFD boundaries²⁸ (growth or contraction).
- Anytime the Governing Fire Board or the Fire Chief feel there is a need to adjust performance service delivery and associated performance objectives.

²⁸ Service delivery impact analysis is part of a standardized evaluation process anytime there is a proposed annexation.



Step 2 – Evaluate Performance (CRA-SOC Section 5)

NWFD evaluates performance at several levels:

- Performance at a District-wide level.
- Performance at the geographical planning zone level (in progress, yet to be completed).
- Unit level (first-due).
- Effective response force level.

Step 3 – Develop Compliance Strategies (CRA-SOC Section 7)

The SOC team will develop compliance strategies that will include, but not limited to:

- Ensure maximization of existing resources including recommendations for reassignment of units.
- Evaluation of partnering opportunities.
- Consideration of alternate means of service delivery.
- Possible recommendations for allocating additional financial resources to improve service delivery.
- Individual or group actions that can improve service delivery.
- Recommend response performance reporting system(s).

Step 4 – Communicate Expectations

This edition of the CRA-SOC clearly outlines service level response performance objectives. These performance objectives need to be communicated to the Operations personnel responsible for service delivery, as well as Support personnel such as Fleet and Logistics. The methods for communicating performance objective expectations may include, but are not limited to:

- Direct communication with crews by the battalion chiefs.
- Training via the video conferencing system.
- Posting of the CRA-SOC on the District's internet and intranet.

Using these and potentially other methods of communication, the SOC team will develop a plan to communicate expectations by the end of calendar year 2016. The plan will also include an element by which members can give feedback regarding the expectations.



Step 5 - Validate Compliance

The Operations Division will be responsible for validating compliance using the following mechanisms:

- Battalion chiefs will monitor real-time FirstWatch® response performance data each tour for gross deviance from performance standards.
- Monthly performance reports that include performance data by unit, station, and battalion will be developed and distributed to all fire officers.
- Quarterly performance reports will be developed and delivered at the SOC team quarterly meetings.
- A comprehensive annual performance report will be developed in partnership with the Operations Division and the SOC team. The annual report will include: all aspects of performance compliance for the previous calendar year, any significant trends that were identified as a result of analyzing performance, any new external influences or altered conditions, new growth and development trends, and new or changing risks. The annual report shall be submitted to the Leadership Team and Governing Fire Board for their review and comments.

Step 6 – Make Necessary Adjustments

By reviewing the information developed for the validation of compliance, any performance “gaps” can be identified and a plan formulated for improvement developed by the Operations Division in partnership with the SOC team.

Annual Review of the CRA-SOC Document

In addition to developing an annual performance report as outlined in Step 5, the SOC team will review on an annual basis the entire CRA-SOC to make any necessary adjustments. Following the SOC team annual review, the CRA-SOC will be reviewed and adopted by the Governing Fire Board, also on an annual basis.



Section 7

Key Findings and Recommendations

A principle benefit of developing a CRA-SOC are the resulting key findings and recommendations. NWFD's CRA-SOC development process identified a number of key findings, many of which resulted in associated recommendations. The SOC team will be responsible for the potential implementation of the listed recommendations.

Key Finding #1

There was nearly a 12% increase in total call volume from 2013 through 2015.

While it was intuitively evident that the call volume was going up, it was surprising to discover the magnitude. The service delivery category responsible for the greatest call volume increase was EMS. Should this trend continue, the compounding effect will have a non-linear effect on the call volume and in turn have a marked impact on service delivery performance.

Recommendation – Determine the primary reasons behind the increase in call volume. Based on this research, develop call volume projections for the next three years.

Key Finding #2

The maximum fire risk occupancies in NWFD are primarily non-sprinklered large garden apartment complexes.

Recommendation – A comprehensive prevention program needs to be developed for all non-sprinklered large garden apartment complexes. Operations needs to ensure that these complexes have up-to-date pre-plans. These complexes should also be incorporated into fire officer CE curriculum.

Key Finding #3

There is only “tribal” information available regarding available water supply from existing fire hydrants.

Recommendation – The District has not performed any hydrant flow tests other than for Certificate of Occupancy purposes for nearly ten years and, as a result, does not have current reliable information regarding available water. There is a need to obtain hydraulic flow modeling and distribution grid information from the water entities as available. If hydraulic modeling information is not available, some field flow testing may be necessary. This information then needs to be made available to Operations personnel in a way that it is readily available for Incident Commanders.

**Key Finding #4**

There is a need for consistent data formatting and regular reporting of performance related data.

Recommendation – Develop a consistent method for collecting performance related data and identify a specific position in the organization that is responsible for all associated collecting and processing of data associated with the performance objectives in this document. This includes the regular distribution of the data in a form useful by the Operations Division and the SOC team. The District has many other needs for data analysis and management beyond those associated with the CRA-SOC; the need may be at a point to create a position at NWFD specifically for data management.

Key Finding #5

There is a need to work with the primary PSAP's to start tracking PSAP transfer times.

Recommendation – Currently, both PSAP's that process NWFD calls do not measure call transfer times. NWFD should work with the PSAP managers to determine what processes needs to be put in place to begin measurement of this element to the customer service interval.

Key Finding #6

There is a need to develop specific risk management plans for most of the large-scale risks identified in Section 3.

Recommendation – Develop risk management plans in the order of risk ranking, for large-scale risks that currently do not have one.

Key Finding #7

The SOC team has traditionally been discontinued following the development of the previous two SOC's. This has resulted in lack of compliance measurement and the delayed identification of other significant factors that can affect the stated performance levels identified in the SOC which can occur after the publication date of the SOC.

Recommendation – The SOC team should remain intact beyond the publication date of this edition of the CRA-SOC. The SOC team should have a strong role in managing the compliance methodology described in Section 6.

Key Finding #8

Call volume for responses into areas without any formalized fire protection is higher than previously thought.



Recommendation – Continue annexation efforts in these areas and ensure residents in these areas know that they are currently without fire protection and, in most cases, have extended response times for EMS related events. Monitor the call volume associated with these areas closely and analyze the impact on emergency service provided within NWFD.

Key Finding #9

There are some areas of the District that have in excess of 10-minute travel times.

Recommendation – A comprehensive prevention program that focuses on the primary risks of these areas should be developed and implemented.

Key Finding #10

Many occupancy risk assessment profile scores are relatively low due to fire code mandating fire suppression systems and inspections that are performed by Prevention and Safety Services during and after construction.

Recommendation – The Risk Assessment Team was comprised jointly of Prevention & Safety and Operations members. During their risk assessment work, this key finding became apparent. It was enlightening for the Operations members to recognize how imperative the role of the Prevention & Safety Division is regarding decreasing the level of risk as it relates to the Operations aspect. The District should continue to seek out opportunities for these two divisions to work together.

Key Finding #11

Extrications are not being tracked as a code classification nor tracked as a TRT call. In addition, motor vehicle accidents are not being tracked as a code classification.

Recommendation – Categorize extrication as a TRT event and track as such. In addition, begin tracking MVA's separately as well. Adjust RMS to reflect this.

Key Finding #12

The District is only tracking losses regarding property losses and only medical code saves regarding medical/trauma calls.

Recommendation – In alignment with the new compliance process described in Section 6, begin tracking property and lives saved on a quarterly basis.



Glossary



Glossary

Accreditation: A process by which an association or agency evaluates and recognizes a program of study or an institution as meeting certain predetermined standards or qualifications. It applies only to institutions and their programs of study or their services.

Adequate: Providing what is needed to meet a given objective without being in excess.

Advanced Life Support (ALS): Emergency medical treatment beyond basic life support level as defined by the medical authority having jurisdiction.

Alarm: A signal or message from a person or device indicating the existence of a fire, medical emergency, or other situation that requires fire department action.

Alarm Answering Time: The time interval that begins when the alarm is received at the communication center and ends when the alarm is acknowledged at the communication center.

Alarm Handling Time: The time interval from the receipt of the alarm at the primary PSAP until the beginning of the transmittal of the response information via voice or electronic means to emergency response facilities (ERFs) or the emergency response units (ERUs) in the field.

Alarm Processing Time: The time interval from when the alarm is acknowledged at the communication center until response information begins to be transmitted via voice or electronic means to emergency response facilities (ERFs) and emergency response units (ERUs).

Alarm Transfer Time: The time interval from the receipt of the emergency alarm at the PSAP until the alarm is first received at the communication center.

Automatic Aid: A plan developed between two or more fire departments for immediate joint response on first alarms.

Baseline Performance: Current level of performance.

Class A Foam: Used to extinguish and overhaul Class A fires. It has insulating qualities and reduces surface tension that results in better penetration of water in Class A materials.

Benchmark Performance: Level of performance the District is trying to achieve long-term.

Community Risk Assessment (Analysis): The evaluation of a community's fire and non-fire hazards and threats, taking into account all pertinent facts that increase or decrease risk in order to define standards of cover.

Company: A group of NWFD Operations members:

- Under the direct supervision of an officer;
- Trained and equipped to perform assigned tasks;
- Usually organized and identified as engine companies, ladder companies, rescue companies, squad companies, or multi-functional companies;
- Operating with one piece of fire apparatus (engine, ladder truck, rescue, squad) except where multiple apparatus are assigned that are dispatched and arrive together, continuously operate together, and are managed by a single company officer;
- Arriving at the incident scene on fire apparatus.



Concentration: Spacing of multiple resources arranged so that an initial effective response force can arrive on scene within the time frames outlined in the on-scene performance objectives.

Credible: Capable of being believed; believable as verified and/or validated.

Critical Task: A time-sensitive work function that is essential along with other work functions to ensure a positive outcome for a performance objective.

Deployment: The strategic assignment and placement of fire agency resources such as fire companies, fire stations and specific staffing levels for those companies required to mitigate community emergency events.

Distribution: Geographic location of all first-due resources for initial intervention. Generally measured from fixed response points, such as fire stations, and expressed as a measure of time.

Effective Response Force (ERF): The minimum amount of staffing and equipment that must reach a specific emergency zone location within a maximum prescribed total response time and is capable of initial fire suppression, EMS and/or mitigation. The ERF is the result of the critical tasking analysis conducted as part of a community risk assessment.

Fire Protection System: The regular interaction of dependent and independent sources of fire protection services, and includes both public and private organizations, apparatus, equipment, fixed and mobile, facilities, methods, human resources, and policies by the authority having jurisdiction.

First-Due Area: The portion of a jurisdiction that each response company has been assigned to be the first unit to arrive at the scene of an emergency. Usually the first-due company is responsible for most activities in that area. See Distribution.

Frequency: The number of occurrences per unit time at which observed events occur or are predicted to occur.

Geographic Planning Zones: The establishment of organized geographical response areas by: size (e.g. square mile or kilometer); or unique occupancy, demographic type or other risk-relevant characteristic.

Hazard: A condition that presents the potential for harm or damage to people, property, or the environment.

Incident: An occurrence, either human-caused or a natural phenomenon, that requires action or support by emergency services personnel to prevent or minimize loss of life or damage to property and/or natural resources.

Incident Commander: The fire department member in overall command of an emergency incident.

Incident Safety Officer: An individual appointed to respond or assigned at an incident scene by the incident commander to perform the duties and responsibilities of that position as part of the command staff.

Mutual Aid: Reciprocal assistance by emergency services under a prearranged plan.



NFPA: Acronym for the National Fire Protection Association.

Outputs: The specifically intended types of results that can be expected from the activities and inputs that are placed into service.

Outcomes: Something that follows an applied activity as a result or consequence.

Percentile: One-hundredth parts; $90/100=90\%$.

PSAP: Acronym for "Public Safety Answering Point".

Rapid Intervention Crew (RIC): A dedicated crew of fire fighters who are assigned for rapid deployment to rescue lost or trapped members.

Risk: A measure of the probability and severity of adverse effects that result from an exposure to a hazard.

Standards of Cover: Those written policies and procedures that establish the distribution and concentration of fixed and mobile resources of an organization.

Total Response Time: The sum of alarm handling (call processing), turn out, and travel times.

Travel Time: The time interval that begins when a unit is en route to the emergency incident and ends when the unit arrives at the scene.

Turnout Time: The time interval that begins when the emergency response facilities and emergency response units (ERUs) notification process begins by either an audible alarm or visual annunciation or both and end at the beginning point of travel time.

Working Fire: Any fire within a structure or building fire causing significant damage to the building and its contents. Generally requires commitment of all initial effective response force responding units.



Appendix

Appendix 1.A

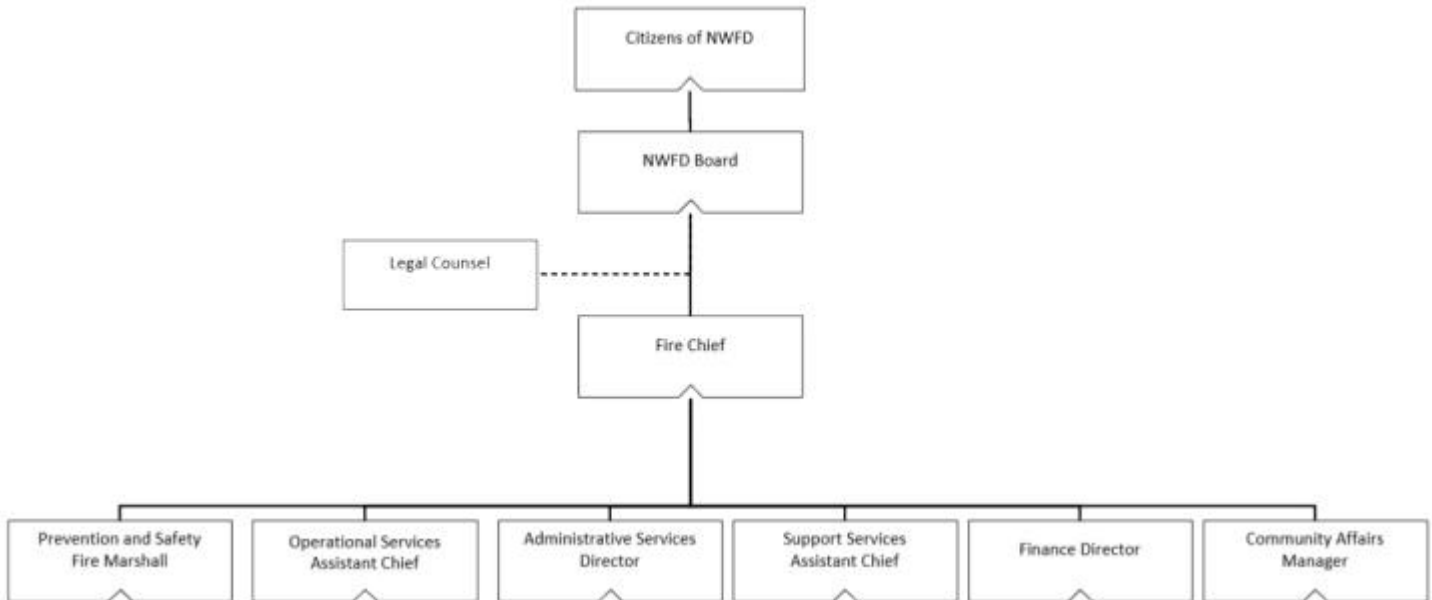
Mission, Vision, Values Statement



Appendix 1.B

NWFD Organizational Charts

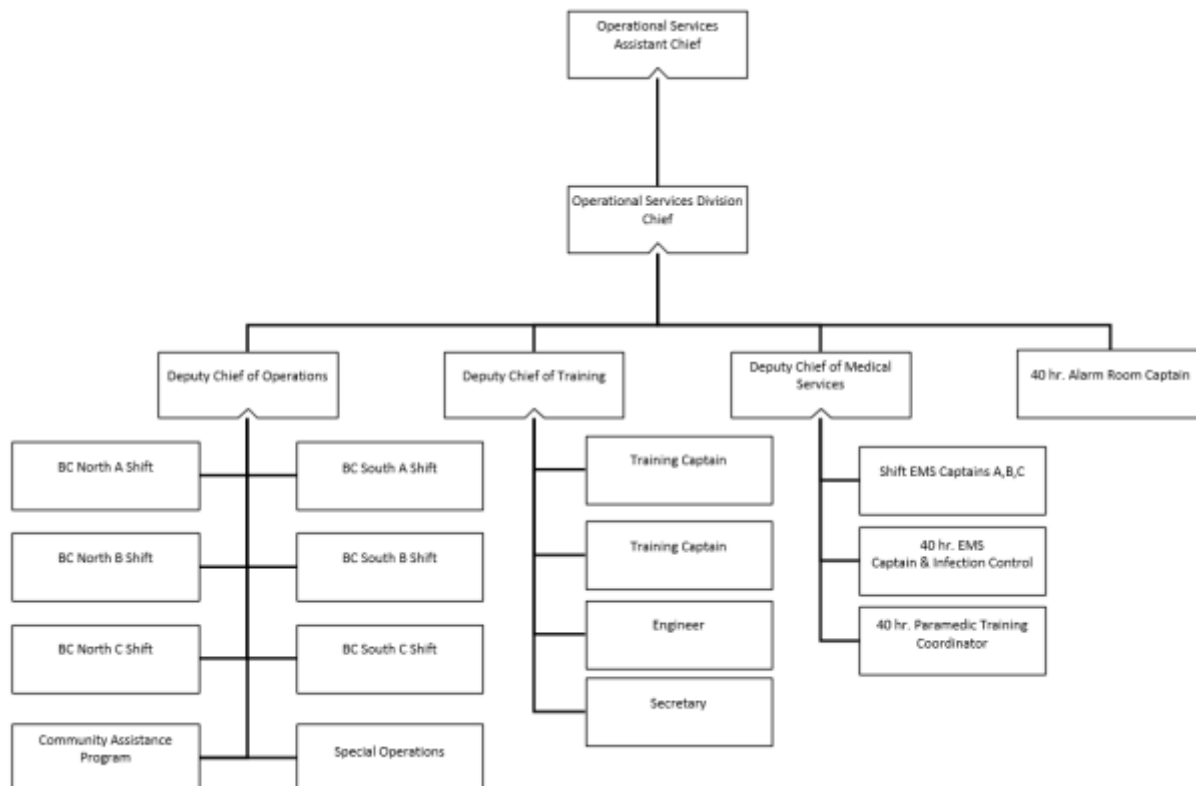
1. Northwest Fire District Organizational Chart



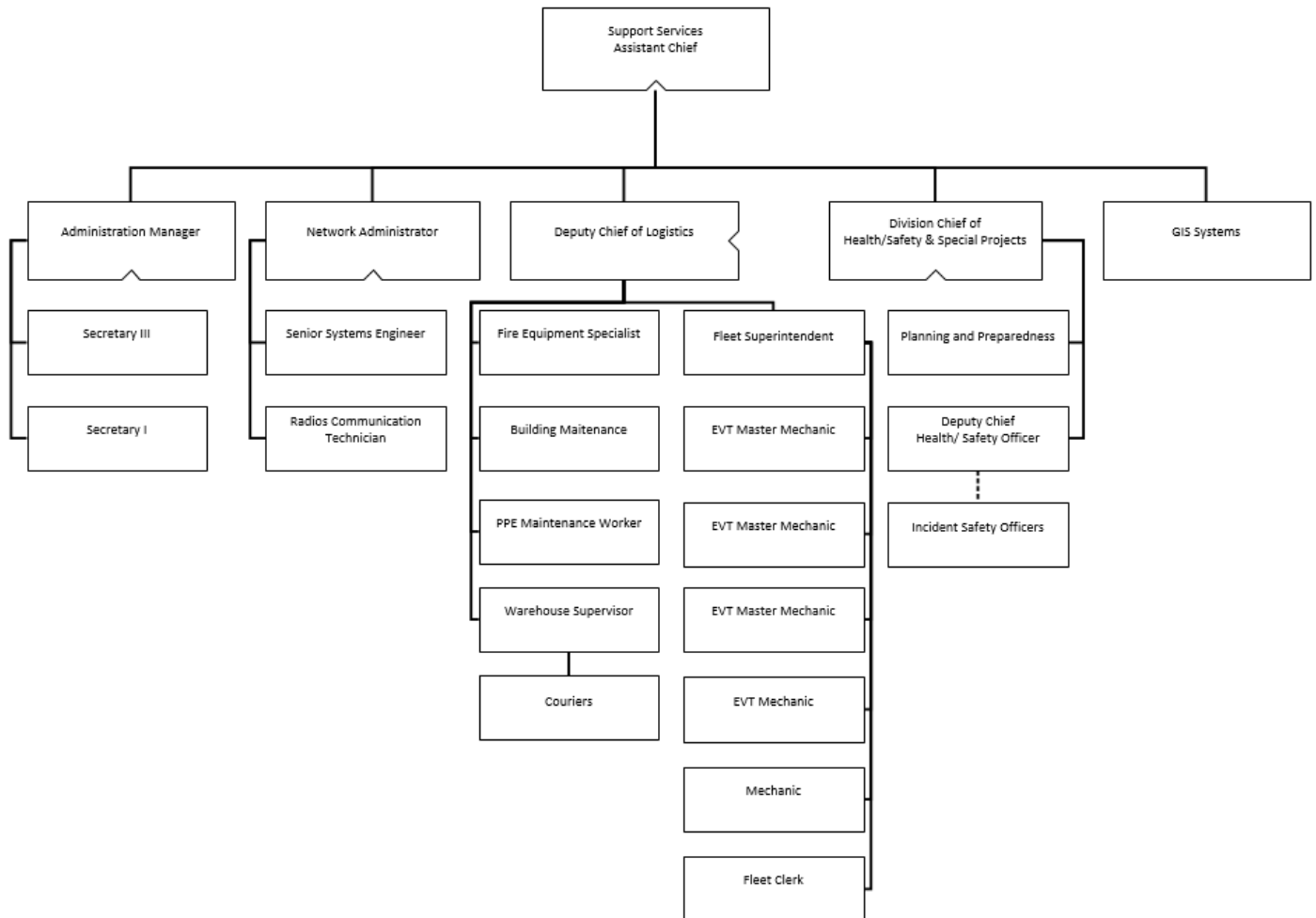
2. Prevention and Safety Organizational Chart



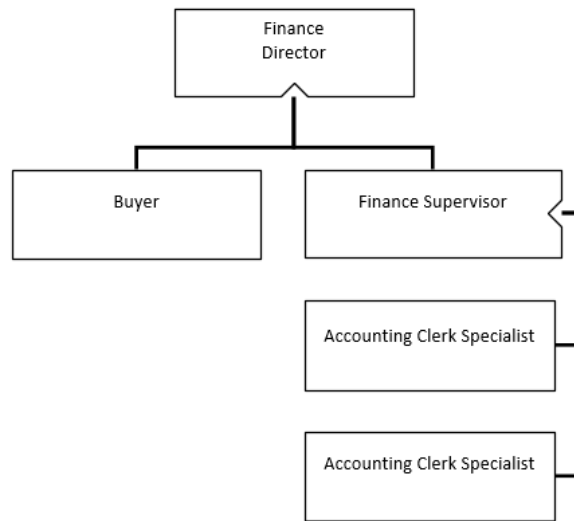
3. Operational Services Organizational Chart



4. Support Services Organizational Chart



5. Finance Director Organizational Chart



6. Community Affairs Organizational Chart



Appendix 1.C

Interstate 10 and Ina Fact Sheet



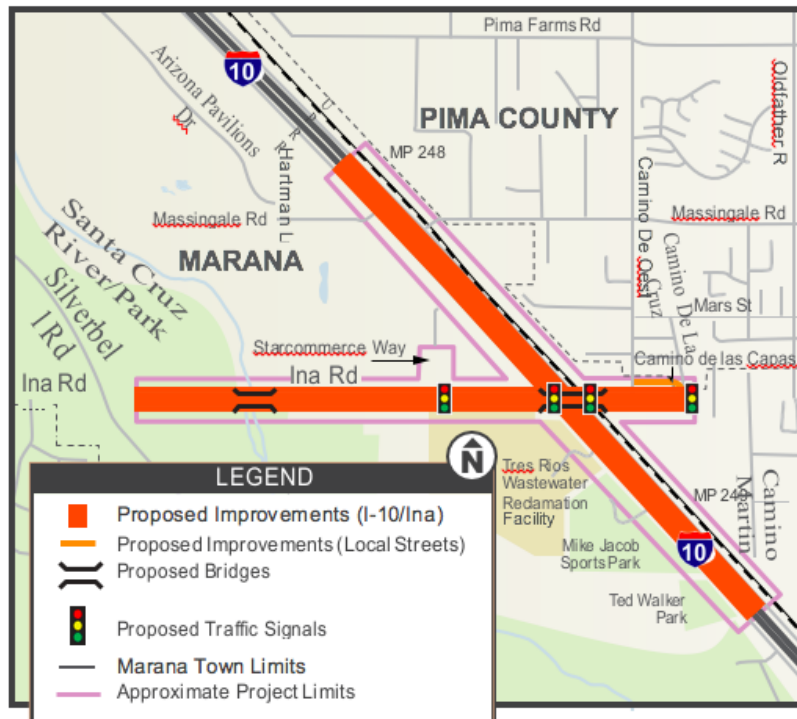
Ina Road Traffic Interchange Final Design

PROJECT DESCRIPTION

The purpose of the interchange reconstruction project is to improve traffic operations on I-10 and on the Ina Road traffic interchange. The project consists of widening I-10 to three lanes in each direction and Ina Road to two lanes in each direction from Silverbell Road to Camino de la Cruz.

The project will enhance safety by eliminating the existing at-grade crossing of Ina Road and the Union Pacific Railroad (UPRR) and building an overpass taking Ina Road over I-10. I-10 will be lowered as part of the new Ina Road overpass construction.

The project will also construct two structures over the Santa Cruz River. The eastbound and westbound frontage roads will be elevated to intersect with the new vertical alignment of Ina Road. The project also includes concrete box culverts, retaining walls, grading, asphalt concrete, drainage facilities, water and sewer relocations, traffic signals, signing, pavement markings, lighting, landscape and irrigation along the interstate, the frontage roads and Ina Road. There are numerous utility relocations that will take place prior to and during the construction of these improvements.



PROJECT TIMELINE *Project schedule is subject to change*

2013

Design Concept Report (DCR) and Environmental Assessment (EA) complete

2016

Complete Final Design

2016-18

- Early 2016 – Utility and pre-construction work begins
- Summer 2016 – Construction begins
- Early 2017 – Ina Road Traffic Interchange closes through 2018

For more information, please contact ADOT Senior Community Relations Officer, Paki Rico: 520.388.4233, PRico@azdot.gov, or go to azdot.gov/InaTI, projects@azdot.gov, or 855.712.8530.

TRACS No.: H8479 01D Federal Aid No.: NH-STP-010-Q(216)S

May 2016

15-070



FOR MORE INFORMATION:
855.712.8530
azdot.gov/InaTI
projects@azdot.gov

Appendix 2.A

Operations Division Shift Position Qualifications

Firefighter
<ul style="list-style-type: none"> • 18+ years old • High School Diploma, GED or higher degree • Valid Driver's License • National Registry EMT-B or EMT-P or State of Arizona EMT or CEP • Emergency Medical Technician (EMT) • Firefighter I & II • CPR • Basic Wildland (S130 and S190) • HazMat First Responder Operations (FRO) • Weapons of Mass Destruction (WMD) Operations
Engineer
<ul style="list-style-type: none"> • A minimum of three (3) years experience as a full-time Firefighter with the District • Completion of the Engineer's Certification Program (in order): • 1 – Support Vehicle Operator (SVO) (<i>completed post Fire Academy</i>) • 2 – Driver/Operator (DO) (<i>must have two years full-time employment with NWFD prior to participating in a DO course. (SVO is a prerequisite)</i>) • 3 – Aerial Operator (AO) (<i>DO is a prerequisite</i>) • Fire Protection Systems or NFA equivalent or other equivalency
Firefighter/Paramedic
<ul style="list-style-type: none"> • High school diploma or GED • A minimum of two (2) years experience as a full-time Firefighter with Northwest Fire District • Paramedic certification through Arizona Department of Health Services • Maintain current ACLS, CPR, PALS, ITLS, and AMLS certifications • Successful completion of Northwest Fire District's Paramedic Certification Program (PCP) • Successful completion of Northwest Fire District's bi-annual National Registry Refresher Class
Captain
<ul style="list-style-type: none"> • Associates degree or higher from an accredited college or university recognized by the U.S. Department of Education • A minimum of one (1) year as an Engineer or Paramedic with Northwest Fire District or eight (8) years as a Firefighter with Northwest Fire District • Completion of a Northwest Fire District Captain Certification Program (CCP)
Battalion Chief
<ul style="list-style-type: none"> • Bachelor's Degree from an accredited college or university recognized by the U.S. Department of Education in Fire Science or a related field, such as Business, Public Administration • A minimum of six (6) years of Northwest Fire District firefighting experience • A minimum of two (2) years of Northwest Fire District supervisory experience at the level of Captain • Blue Card Incident Command Certification • Northwest Fire District Battalion Chief Certification Program (BCP) • Manager (BC) memo recommendation for promotion • Division Manager (DC) memo recommendation for promotion



Appendix 3.A

PRI Scoring Matrix

Priority Risk Index Scoring Guide

Score	Probability	Severity	Spatial Extent	Onset / Warning	Duration
1	Rare	Negligible	Small	Day or more	1-4 hours
2	Unlikely	Minor			Up to 12 hours
3	Occasional	Moderate	Moderate	Hours	12 to 24 hours
4	Likely	Serious			1-2 days
5	Almost certain	Catastrophic	Large	None	> 2 Days

Event	Probability ¹ (30%) 1-5	Severity ² (30%) 1-5	Spatial Extent (20%) 1-5	Speed of Onset / Warning (10%) 1-5	Duration (10%) 1-5	TOTAL SCORE
Major Hazmat						
Score	4	4	4	5	4	
Weighted score	1.2	1.2	0.8	0.5	0.4	4.1
WUI						
Score	2	3	3	3	3	
Weighted Score	0.6	0.9	0.6	0.3	0.3	2.7
WMD						
Score	2	5	3	5	2	
Weighted Score	0.6	1.5	0.6	0.5	0.2	3.4
Extended Power Outage³						
Score	2	4	5	5	4	
Weighted score	0.6	1.2	1.0	0.5	0.4	3.7
IT Cyber Attack						
Score	3	4	1	5	3	
Weighted score	0.9	1.2	0.2	0.5	0.3	3.1
Santa Cruz Flood Event						
Score	2	4	4	1	5	
Weighted score	0.6	1.2	0.8	0.1	0.5	3.2
Pandemic						
Score	1	4	4	1	5	
Weighted Score	0.3	1.2	0.8	0.1	0.5	2.9
MCI						
Score	4	4	1	5	1	
Weighted Score	1.2	1.2	0.2	0.5	0.1	3.2
Microburst						
Score	5	2	3	3	1	
Weighted Score	1.5	0.6	0.6	0.3	0.1	3.1

Greater than 4.0 = high risk, 3.0-3.9 = moderate risk, <3.0 = low risk

¹ The probability of event occurring within five years

² Severity includes injuries/fatalities, property environmental considerations

³ A power outage that is region-wide likely due to a grid failure, and longer than approximately 12 hours



Appendix 3.B

ORAP Form

SCORE 0		Northwest Fire District Occupancy Risk Assessment Profile					
Business / Building Name						REPORT BY	
ADDRESS (DIR/NAME)						CITY BLDG/SUITE	
DATE		FH OCC ID	PLAT (no "I" or "A")	PREPLAN	STATION	SHIFT	
Yellow = Required							
SAVE FILE		LIST ANY SPECIAL HAZARDS OR TACTICAL PLANNING INFORMATION HERE					
RESET FORM							
CONSTRUCTION TYPE	Type - I	Type - II	Type IV	Type III	Type - V	Unusual Construction Features	Abandoned or Under Construction
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOTAL SQUARE FOOTAGE	<1,000 Sq Ft	1,001 - 2,500 Sq Ft		2,501 - 7,500 Sq Ft	7,500 - 25,000 Sq Ft	25,000 - 100,000 Sq Ft	> 100,000 Sq Ft
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NUMBER OF FLOORS ABOVE GRADE	1 Floor Above Grade		Mezzanine	2 - 3 Floors Above Grade	4 Floors Above Grade		> 5 Floors Above Grade
	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
NUMBER OF FLOORS BELOW GRADE	No Floors Below Grade						1 or More Floors Below Grade
	<input type="checkbox"/>						<input type="checkbox"/>
GROUND LADDER/AERIAL ACCESS TO ROOF	Ground Ladder & Aerial Access				24 - 35' Ground Ladder Access Only		
	<input type="checkbox"/>				<input type="checkbox"/>		
TYPICAL BUILDING OCCUPANCY	No Occupants	1 - 10 Occupants	11 - 25 Occupants	26 - 100 Occupants	100 - 300 Occupants		>300 Occupants
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
MOBILITY OF OCCUPANTS	Not Regularly Occupied	Ambulatory			Ambulatory With Assistance	Mix of Ambulatory and Non-Ambulatory	Non Ambulatory/Diminished Mental Capacity
	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
APPARATUS ACCESS	All Sides of Structure	3 Sides of Structure		2 Sides of Structure		1 Side Of Structure	No Side of Structure/ No Access
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
HYDRANT WATER SUPPLY	Within 300 Ft	301 - 800 Ft	801 - 1,000 Ft		1,001 - 2,000 Ft	2,001 - 3,000 Ft	> 3,000 Ft
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TRAVEL TIME	0 - 3 Minutes		4 - 7 Minutes			8-12 Minutes	> 12 Minutes
	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
AUTOMATIC SPRINKLER SYSTEM	Fully Sprinklered (Total Risk Number Reduced by 50 %)						
	<input type="checkbox"/>						
FIRE ALARM SYSTEM	Monitored Fire Alarm System		Local Fire Alarm System				No Fire Alarm System
	<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>
EXPOSURES WITHIN 30' (Includes floor above/below)	No Exposures		1-Exposure	2-Exposures	3-Exposures		
	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
NFPA 704 (HIGHEST # IN THE DIAMOND)	NONE	1		2	3	4 or Special Hazard	More than 1 x #4 Value in Diamond
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FIRE LOAD - (The amount of combustible content in the occupancy)	Low/No Load			Medium Load		High Load	
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	
SPECIFIC FIREFIGHTER SAFETY CONSIDERATIONS	Minimal Impact			Moderate Impact		High Impact	Severe Impact
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>



Appendix 3.C

Individual Occupancy Risk Assessment Profiles

Fire Station 30 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
AAA of Arizona	6950 N. Oracle Rd.	13	Moderate
Walgreens	2150 W. Orange Grove Rd.	17	Moderate
Citrine Dentistry	5601 N. Oracle Rd.	21	Moderate
Carondelet Surgery Center	2220 W. Orange Grove Rd.	22	Moderate
Wells Fargo Bank	6270 N. Oracle Rd.	22	Moderate
State Farm Insurance	615 W. Roller Coaster Rd.	22	Moderate
Tucson Coin	6350 N. Oracle Rd.	24	Moderate
Ethan Allen Furniture	5621 N. Oracle Rd.	25	Moderate
Chantilly Tea Room (Vacant)	5185 N. Oracle Rd.	25	Moderate
Catalina Church	480 E. Ina	26	Moderate
Affinity Eye Care	6651 N. Oracle Rd.	26	Moderate
Oreganos	100 W. Orange Grove Rd.	26	Moderate
Children's Medical Center	5861 N. Oracle Rd.	26	Moderate
Chase Bank	6000 N. Oracle Rd.	27	Moderate
Ace Hardware	6488 N. Oracle Rd.	28	Moderate
Smile Perfection	5828 N. Oracle Rd.	29	Moderate
Desert Cardiology	6080 N. La Cholla Blvd.	29	Moderate
Faith Community Church	2551 W. Orange Grove Rd.	29	Moderate
Arizona Vein & Vascular Center	5585 N. Oracle Rd.	30	Moderate
Kosho Martial Training Center	151 W. Orange Grove Rd.	32	Moderate
Village Inn	6251 N. Oracle Rd.	33	Moderate
Northwest Surgery Center	6320 N. La Cholla Blvd.	36	High
Putney's Pub	6090 N. Oracle Rd.	38	High
Rigo's Restaurant	5851 N. Oracle Rd.	39	High
Urological Associates	2260 W. Orange Grove Rd.	40	High
Denny's	5000 N. Oracle Rd.	41	High
Hi Flautin	6780 N. Oracle Rd.	43	High
Plaza de Oro	6421 - 6488 N. Oracle Rd.	46	High
San Marco's Plaza	5931 N. Oracle Rd.	46	High
Office Complex	6700 N. Oracle Rd.	48	High
Courtyard Offices	5669 N. Oracle Rd.	51	High
USPS Casas Adobes Branch	6281 N. Oracle Rd.	53	High
Dove of Peace	651 W. Roller Coaster Rd.	60	High
Fishkind and Bakewell	5599 N. Oracle Rd.	70	High
Catalina Foothills Lodge Apartments	5250 N. Oracle Rd.	75	High
Casa Blanca Plaza	6030 N. Oracle Rd.	83	Maximum
Casas Adobes Congregational United	6801 N. Oracle Rd.	86	Maximum



Fire Station 31 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
AGM Fabrication	4260 N. Sullinger Ave.	19	Moderate
Abracadabra	4814 N. Shamrock Pl.	20	Moderate
Southwest Energy Fleet	4240 N. La Cholla Blvd.	21	Moderate
Dollar General	1742 W. Ruthrauff Rd.	21	Moderate
Walgreens	1415 W. River Rd.	22	Moderate
Centennial Elementary	2220 W. Wetmore Rd.	22	Moderate
Arizona Feeds	4743 N. Highway Dr.	25	Moderate
Poly Print	2300 W. Wetmore Rd.	25	Moderate
Walmart	2175 W. Ruthrauff Rd.	25	Moderate
Sonoran Science Academy	2325 W. Sunset Rd.	26	Moderate
Sporting Chance	2100 W. Curtis	30	Moderate
Ruthrauff Commerce Center	2010-2070 W. Ruthrauff Rd.	32	Moderate
PIMA Lung & Sleep	5310 N. La Cholla Blvd.	32	Moderate
Pool Water Products	4825 N. Shamrock Pl.	35	Moderate
Whittney Burns Shutters	2755 W. Ruthrauff Rd.	35	Moderate
Southwest Energy Offices	2040 W. Gardner	37	High
AFNI	5320 N. La Cholla Blvd.	38	High
American Turbo Systems	4210 N. Sullinger	43	High
Ewing Irrigation & Golf	4905 N. Shamrock Pl.	50	High
APE Fuel	4250 N. Sullinger	54	High
AAA Landscaping	4742 N. Romero	54	High
Crop Product Services	4429 N. Hwy Dr.	69	High
Precision Planting	2557 W. Violet	71	High
Charles Car and Truck Repair	4410 N. Hwy Dr.	75	High
Horizon Steel Co	2325 W. Curtis Rd.	84	Maximum

Fire Station 32 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
Accelerated Learning Lab	5245 N. Camino de Oeste	80	Maximum



Fire Station 33 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
Enterprise Rent-A-Car	4545 W. Ina Rd.	9	Moderate
Gerrigan's Auto Repair	4528 W. Ina Rd.	11	Moderate
Ridenow Powersports on Ina	4375 W. Ina Rd.	14	Moderate
Pima Federal Credit Union	6510 N. Thornydale	14	Moderate
Dairy Queen	4146 W. Ina Rd.	15	Moderate
Antigua de Mexico	3235 W. Orange Grove Rd.	16	Moderate
Donut Wheel	4524 W. Ina Rd.	17	Moderate
Harley Davidson Motorcycles	7355 N. 1-10 Frontage Rd.	18	Moderate
Walgreens	3800 W. Thornydale	18	Moderate
CVS	3875 W. Ina Rd.	18	Moderate
Pima County MVD	7300 N. Shannon	19	Moderate
La Parrilla Suiza	4259 W. Ina Rd.	21	Moderate
Harbor Freight	3970 W. Ina Rd.	22	Moderate
Quality Lube and Tune	3631 W. Ina Rd.	22	Moderate
U-Haul	4040 W. Ina Rd.	23	Moderate
Pep Boys	4275 W. Ina Rd.	23	Moderate
Chula Vista Landscaping	6985 Camino Martin	23	Moderate
MPG Automotive	3571 W. Ina Rd.	23	Moderate
Nanni (Pima County) Library	7300 N. Shannon	24	Moderate
Practice Tee	4050 W. Costco	24	Moderate
Barber Shop	3701 W. Ina Rd. #102	24	Moderate
New West Drywall	6804 Camino Martin	24	Moderate
Chase Bank	7175 Thornydale Rd.	26	Moderate
Hurter Contracting	6930 Camino Martin	26	Moderate
Safe-lite Auto Glass	3791 W. Ina Rd.	26	Moderate
Storage Direct	7020 Camino Martin	26	Moderate
Oldfather Inn	4080 W. Ina Rd.	29	Moderate
Bisbee Breakfast Club	4131 W. Ina Rd.	29	Moderate
Block Advisors	3701 W. Ina Rd. #110	29	Moderate
Midar Auto Services	3601 W. Ina Rd.	32	Moderate
Molinito's Mexican Food	3675 W. Ina Rd.	32	Moderate
Discount Tire	3960 W. Ina Rd.	33	Moderate
Starbucks Bldg.	3951 W. Ina Rd.	33	Moderate
Northwest RV & Self Storage	7041 Camino Martin	35	Moderate
A-Atlas Storage	4320 W. Ina Rd.	39	High
7100 Commercial Bldg.	7100 N. Camino Martin	39	High
National RV Center	6260 N. Travel Center Dr.	42	High
Complex	4321 Ina Rd.	44	High
O'Riellys Auto Parts	3601 W. Ina Rd.	50	High
Window Tint and Glass	7100 N. Camino Martin	54	High
Jack Furriers Tire and Auto Care	4291 W. Ina Rd.	57	High
Ina Rd. Self Storage	6950 Camino Martin	57	High



Fire Station 34 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
Bank of America	8240 N. Cortaro Rd	9	Moderate
Wells Fargo Bank	7820 N. Silverbell	11	Moderate
ACE	8165 N. Courtney Page Way	12	Moderate
Vantage West Credit Union	8290 N. Cortaro Rd.	12	Moderate
Mister Hot Shine	8215 N. Courtney Page Way	13	Moderate
AutoZone	7855 N. Leilani Ln.	14	Moderate
Chase	6050 W. Jenna Nicole Ln.	15	Moderate
John Deere	9659 N. Tiffany Loop	17	Moderate
CVS Pharmacy	7740 N. Cortaro Rd.	17	Moderate
Walgreens	7800 N. Cortaro Rd.	17	Moderate
Northwest Medical Center	8333 N. Silverbell	19	Moderate
Xfinity	8251 N. Cortaro Rd.	20	Moderate
Jack Furrier	8051 N. Casa Grande Hwy	22	Moderate
Brake Max	6055 Jenna Nicole Ln.	22	Moderate
LA Fitness	5885 W. Arizona Pavilions Dr.	24	Moderate
Harkins Movie Theater	5755 W. Arizona Pavilions Dr.	27	Moderate
KOHL'S	5850 W. Arizona Pavilions Dr.	29	Moderate
Lil Abner's Steakhouse	8501 N. Silverbell	40	High

Fire Station 35 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
Cottonwood de Tucson	4110 W. Sweetwater	18	Moderate
International Wildlife Museum	4800 W. Gates Pass Rd.	30	Moderate



Fire Station 36 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
Family Dollar	11825 W. Grier	20	Moderate
Ventana Medical Warehouse	9831 W. Tangerine	23	Moderate
Nico's Taco Shop	11855 W. Marana Rd.	31	Moderate
AZ Fabrication	13720 N. Sandario Rd. B	34	Moderate
Eddie's Towing	13360 N. Sandario Rd.	34	Moderate
Marana Regional Airport	11700 W Avra Valley Rd.	99	Maximum
Marana Health Center	13395 N. Marana Main St.	35	High
Pierce Automotive	13780 N. Sandario Rd.	36	High
Marana Town Building	11555 W. Civic Center Drive	36	High
NAPA	13750 N. Sandario Rd.	40	High
LA Tumbleweed Lounge	13915 N. Sandario Rd.	41	High
DC's Cabinets	13720 N. Sandario Rd.	49	High
Triple L Feed and Supply	13700 N. Sandario Rd.	49	High
MJHS Vehicle Maintenance/ Warehouse	11279 W. Grier	77	High
Marana Stockyards	14901 W. Kirby Hughes Rd.	80	Maximum

Fire Station 37 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
Gallery Fitness Center	13965 N. Dove Mountain	14	Moderate
Golf Club at Dove Mountain	6501 W Boulder Bridge Pass	18	Moderate
Highlands Club House	4949 W. Heritage Club Blvd.	19	Moderate
Del Webb Community Center	14085 N. Del Webb Trail	20	Moderate
Marana Health Center Dove Mountain	5224 W. Dove Center Rd.	20	Moderate
Park n' Shade	7935 W. Tangerine Rd.	22	High
Gallery Golf Club and Restaurant	14000 N. Dove Mountain	23	High
Gallery Restaurant	14000 N. Dove Mountain	23	High
Trico Electric	8600 W. Tangerine Rd.	23	High
Highlands Golf Maintenance	5355 W. Winding Desert	33	High
Gallery Golf Maintenance	13965 N. Dove Mountain	42	High
Golf Club Maintenance	14388 N. Dove Mountain	74	High



Fire Station 38 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
Tractor Supply	7735 N. Casa Grande Highway	22	Moderate
US Post Office	5800 W. Arizona Pavilions	29	Moderate
New Life Church	4900 W. Cortaro	30	Moderate
Lowes	4075 W. Ina Rd.	31	Moderate
Coca Cola	5551 W. Coca Cola Pl.	33	Moderate
Krebs Engineering	5055 N. Gillette	43	High
Oasis Water	5600 W. Coca Cola Pl.	51	High
Arthur Pak Golf Course Clubhouse	9101 N. Thornydale	59	High
Sargent Controls	5675 W. Burlingame	69	High

Fire Station 39 Risk Assessment Profile

Occupancy	Address	Score	Risk Category
Chase Bank	12025 N. Thornydale	12	Moderate
Bianchi's	3620 W. Tangerine Rd.	17	Moderate
Fletcher's Tire	3650 W. Tangerine Rd.	21	Moderate



Appendix 3.D

EMS Call Type Summary

Types and Frequencies of EMS Calls


Incident	2011	2012	2013	2014	2015	5 Year Total
Abdominal Pains	270	279	229	297	314	1,389
Allergies / Envenomation	125	111	121	119	114	590
Animal Bites / Attacks	23	167	27	26	18	261
Assault / Rape	175	73	162	152	19	581
Back Pain (Non-Traumatic)	118	130	116	104	113	581
Breathing Problems/ Asthma	936	922	933	1,015	1,040	4,846
Burns / Explosions / Scalds	8	4	10	13	5	40
Cardiac / Respiratory Arrest	164	171	139	201	177	852
Chest Pains	835	832	761	808	799	4,035
Child Locked in Car	64	51	45	54	48	262
Choking	40	64	60	53	44	261
Co / Inhalation	8	4	3	3	7	25
Convulsion / Seizures	318	319	369	317	316	1,639
Diabetic Problem	226	239	224	238	191	1,118
Drowning / Diving Accident	1	2	2	2	3	10
Electrocution	3	3		2	3	10
Eye Problems / Injury	8	16	12	9	12	57
Falls/ Back Injuries (Traumatic)	1,411	1,370	1,360	1,468	1,424	7,033
Headache	47	75	58	48	75	303
Heart Problems	184	170	156	159	134	803
Heat / Cold Exposure	24	18	26	22	20	110
Helicopter Standby			1			1
Hemorrhage / Lacerations	313	361	353	347	343	1,717
Interstate ALS					7	7
Interstate BLA					9	9
Invalid Assistance < 250 LBS.					572	572
Invalid Assistance > 250 LBS.					96	96
Law Enforcement ALS				83	365	448
Law Enforcement ALS Hold Off					24	24
Law Enforcement ALS No Hold Off					67	67
Law Enforcement BLS				94	464	558
Law Enforcement BLS Hold Off					23	23
Law Enforcement BLS No Hold Off					80	80
Law Enforcement Gunshot Hold Off					4	4
Law Enforcement No Gunshot Hold Off					2	2
Law Enforcement Hanging					2	2
Law Enforcement Shooting / Stabbing				2	10	12



Lock In			2	5		7
Machinery / Entrapment	1					1
Major Medical Full Alarm	3	8	7	2	3	23
Medical Alarm				11	334	345
OD / Ingestion / Poisoning	285	320	326	295	141	1,367
Pregnancy / Childbirth	30	37	28	30	30	155
Public Assist					1	1
Sick Person	1,943	2,062	1,834	1,892	1,817	9,548
Stab / Gunshot Wound	30	36	44	30	11	151
Stroke / CVA	319	355	304	328	293	1,599
Traffic Accidents	913	1,186	897	801	907	4,704
Transfer / Interfacility / Palliative		1	49	355	648	1,053
Traumatic Injuries / Specific	372	141	313	358	292	1,476
Unconscious / Fainting	659	706	749	832	779	3,725
Unknown Problem (Man Down)	506	442	412	429	130	1,919
Grand Total	10,362	10,675	10,132	11,004	12,330	54,503

Appendix 4.A

Rules of Engagement



Rules You Can LIVE By

RULES OF ENGAGEMENT FOR FIREFIGHTER SURVIVAL

1. Size up your tactical area of operation.
2. Determine the occupant survival profile.
3. DO NOT risk your life for lives or property that cannot be saved.
4. Extend LIMITED risk to protect SAVABLE property.
5. Extend VIGILANT and MEASURED risk to protect and rescue SAVABLE lives.
6. Go in together, stay together, come out together.
7. Maintain continuous awareness of your air supply, situation, location and fire conditions.
8. Constantly monitor fireground communications for critical radio reports.
9. You are required to report unsafe practices or conditions that can harm you. Stop, evaluate and decide.
10. You are required to abandon your position and retreat before deteriorating conditions can harm you.
11. Declare a Mayday as soon as you THINK you are in danger.

THE INCIDENT COMMANDER'S RULES OF ENGAGEMENT FOR FIREFIGHTER SAFETY

1. Rapidly conduct, or obtain, a 360-degree situational size-up of the incident.
2. Determine the occupant survival profile.
3. Conduct an initial risk assessment and implement a SAFE ACTION PLAN.
4. If you do not have the resources to safely support and protect firefighters, seriously consider a defensive strategy.
5. DO NOT risk firefighter lives for lives or property that cannot be saved. Seriously consider a defensive strategy.
6. Extend LIMITED risk to protect SAVABLE property.
7. Extend VIGILANT and MEASURED risk to protect and rescue SAVABLE lives.
8. Act upon reported unsafe practices and conditions that can harm firefighters. Stop, evaluate and decide.
9. Maintain frequent two-way communications, and keep interior crews informed of changing conditions.
10. Obtain frequent progress reports and revise the action plan.
11. Ensure accurate accountability of every firefighter's location and status.
12. If after completing the primary search, little or no progress toward fire control has been achieved, seriously consider a defensive strategy.
13. Always have a rapid intervention team in place at all working fires.
14. Always have firefighter rehab services in place at all working fires.

The Rules of Engagement® are a product of the IAPF Safety, Health and Survival Section
Sponsored by Honeywell First Responder Products in The Interest Of All Firefighters Returning To Quarters Safely...After Every Run

Honeywell
First Responder Products

FIRE RESCUE
A Division of Honeywell

Appendix 4.B

Letter



1000 Bishops Gate Blvd. Ste 300
Mt. Laurel, NJ 08054-5404

t1.800.444.4554 Opt.2
f1.800.777.3929

September 26, 2016

Mr. Gilbert Davidson, City Manager, Village Manager and S
Northwest FPSA
11555 W. Civic Center Drive
Marana, Arizona, 85653

RE: Northwest Fpsa, Pima County, Arizona
Public Protection Classification: 02/2Y
Effective Date: January 01, 2017

Dear Mr. Gilbert Davidson,

We wish to thank you Mr. Steve Shepard, Mr. David Ruiz, Mr. David Crockett, Mr. Paul Martinez, Chief Gary West, Ms. Sandy Elder and Chief Michael Brandt for your cooperation during our recent Public Protection Classification (PPC) survey. ISO has completed its analysis of the structural fire suppression delivery system provided in your community. The resulting classification is indicated

If you would like to know more about your community's PPC classification, or if you would like to learn about the potential effect of proposed changes to your fire suppression delivery system, please call us at the phone number listed below.

ISO's Public Protection Classification Program (PPC) plays an important role in the underwriting process at insurance companies. In fact, most U.S. insurers – including the largest ones – use PPC information as part of their decision-making when deciding what business to write, coverage's to offer or prices to charge for personal or commercial property insurance.

Each insurance company independently determines the premiums it charges its policyholders. The way an insurer uses ISO's information on public fire protection may depend on several things – the company's fire-loss experience, ratemaking methodology, underwriting guidelines, and its marketing strategy.

Through ongoing research and loss experience analysis, we identified additional differentiation in fire loss experience within our PPC program, which resulted in the revised classifications. We based the differing fire loss experience on the fire suppression capabilities of each community. The new classifications will improve the predictive value for insurers while benefiting both commercial and residential property owners. We've published the new classifications as "X" and "Y" – formerly the "9" and "8B" portion of the split classification, respectively. For example:

- A community currently graded as a split 6/9 classification will now be a split 6/6X classification; with the "6X" denoting what was formerly classified as "9."
- Similarly, a community currently graded as a split 6/8B classification will now be a split 6/6Y classification, the "6Y" denoting what was formerly classified as "8B."



- Communities graded with single "9" or "8B" classifications will remain intact.
- Properties over 5 road miles from a recognized fire station would receive a class 10.

PPC is important to communities and fire departments as well. Communities whose PPC improves may get lower insurance prices. PPC also provides fire departments with a valuable benchmark, and is used by many departments as a valuable tool when planning, budgeting and justifying fire protection improvements.

ISO appreciates the high level of cooperation extended by local officials during the entire PPC survey process. The community protection baseline information gathered by ISO is an essential foundation upon which determination of the relative level of fire protection is made using the Fire Suppression Rating Schedule.

The classification is a direct result of the information gathered, and is dependent on the resource levels devoted to fire protection in existence at the time of survey. Material changes in those resources that occur after the survey is completed may affect the classification. Although ISO maintains a pro-active process to keep baseline information as current as possible, in the event of changes please call us at 1-800-444-4554, option 2 to expedite the update activity.

ISO is the leading supplier of data and analytics for the property/casualty insurance industry. Most insurers use PPC classifications for underwriting and calculating premiums for residential, commercial and industrial properties. The PPC program is not intended to analyze all aspects of a comprehensive structural fire suppression delivery system program. It is not for purposes of determining compliance with any state or local law, nor is it for making loss prevention or life safety recommendations.

If you have any questions about your classification, please let us know.

Sincerely,

Dominic Santanna

Dominic Santanna
Manager -National Processing Center

cc: Mr. Steve Shepard, Superintendent, Metropolitan Water District
Mr. David Ruiz, Water Supervisor, Oro Valley Water Utility
Mr. David Crockett, Water Superintendent, Flowing Wells Irrigation District
Mr. Paul Martinez, Public Works Director, Marana Water Department
Chief Gary West, Division Chief, Northwest Fire Department
Ms. Sandy Elder, Director, Tucson Water Department
Chief Michael Brandt, Chief, Northwest Fire Department
Chief Mike Garcia, Deputy Director, Tucson Fire Regional PSAP Dispatch